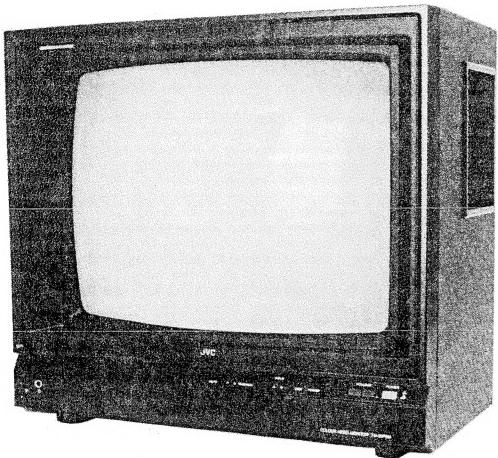


**JVC**

# SERVICE MANUAL

## 20" COLOUR VIDEO MONITOR

MODEL **TM-20PSN** (D)



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### SPECIFICATIONS

(Design and specifications subject to change without notice).

Dimension : 52.2 cm (W) x 48.8 cm (D) x 48.3 cm (H)	LINE OUT
Weight : (Without reflector)	Video ..... 1 Vp-p, 75 Ω
Weight : 26.1 kg	Audio ..... 300 mVrms (-8 dBs) Low Impedance
Colour system ... PAL/SECAM/NTSC (3.58MHz, 4.43MHz)	Scan frequency ..... H. 15.75 kHz/15.625 kHz
Scanning ..... 525 Lines, 60 Hz (NTSC)	V. 50 Hz/60 Hz
..... 625 Lines, 50 Hz (PAL/SECAM)	Power Input ..... 120V ~ 240V AC, 50 Hz/60 Hz
Horizontal resolution ..... 270 Lines (NTSC)	Power Consumption ..... 105W (max.), 90W (avg.)
..... 300 Lines (PAL/SECAM)	Picture Tube ..... 20" In-Line
<b>INPUT A/B</b>	Viewable Picture Size ..... 30.3 cm (H) x 40.4 cm (W)
○ Video ..... 1 Vp-p, 75 Ω	High Voltage ..... 27 kV ± 1 kV (at zero beam current)
○ Audio ..... 390 mVrms (-6 dBs), Hi. Impedance	Speaker ..... 10 cm round type x2, 12.5 Ω
<i>(A terminal are bridge termination with front and rear terminal. B terminal are bridge termination with VTR connector, however bridge out put level of audio is 300 mVrms (-8 dBs).)</i>	Audio Power Output ..... 3W + 3W, 12.5 Ω
○ VTR Connector (EIAJ 8 Pin)	Tube ..... 1
Video in ..... 1 Vp-p, 75 Ω	IC ..... 18
Video out ..... 1 Vp-p, 75 Ω	Transistor ..... 87
Audio in ..... 775 mVrms (0 dBs), Hi. Impedance	
Audio out ..... 300 mVrms (-8 dBs), Low Impedance	

# 1. SAFETY PRECAUTION

1. The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of receiver should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in television sets have special safety-related characteristics.. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by (  ) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. If any repair has been made to the chassis, it is recommended that the  $B_1$  setting should be checked or adjusted (See ADJUSTMENT OF  $B_1$ , POWER SUPPLY).
5. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives apporived by the manufacturer of the complete product.
6. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a  $10k\Omega$  2W resistor to the anode button.
7. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

## 8. ISOLATION CHECK

### (SAFETY FOR ELECTRICAL SHOCK HAZARD)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, channel selector knobs, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

#### (1) DIELECTRIC STRENGTH TEST

The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3,000V AC (r.m.s.) for a period of one second.

This method of test requires a test equipment not generally found in the service trade.

#### (2) LEAKAGE CURRENT CHECK

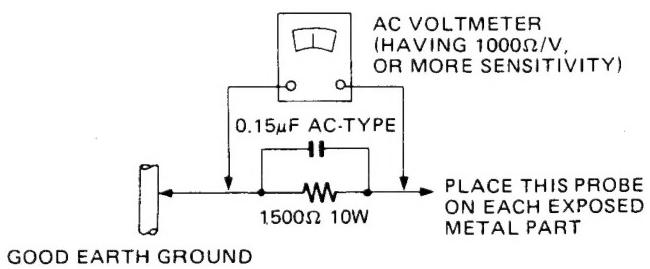
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.) Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA.

#### ● ALTERNATE CHECK METHOD

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a  $1500\Omega$  10W resistor, paralleled by a  $0.15\mu F$  AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.).

Measure the AC voltage across the resistor with the AC voltmeter.

Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.35V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).



## 2. FEATURES

- Copes with PAL/SECAM/NTSC colour system.
- Adopts microcomputer IC's for DC controls of sound volume, bright, colour, picture and so on.
- With two AV input terminals.
- Skew switch that corrects a bent portion of the screen when play back a VTR.
- Adopts a stereo circuit on the audio circuit.
- Adopts a switching regulator on the power supply circuit.

## 3. OUTLINE

- This model is a video monitor that copes with PAL/SECAM/NTSC colour system.

### 1. Automatic switching of colour system

#### (1) PAL/SECAM $\leftrightarrow$ NTSC switching

The vertical frequency detection voltage is used as the switching signal.  
 $50\text{ Hz} \rightarrow \text{PAL/SECAM}$ ,  $60\text{ Hz} \rightarrow \text{NTSC}$

#### (2) PAL $\leftrightarrow$ SECAM switching

The killer voltage of the PAL/SECAM colour circuit is used as the switching signal.

### 2. Manual switching of colour system

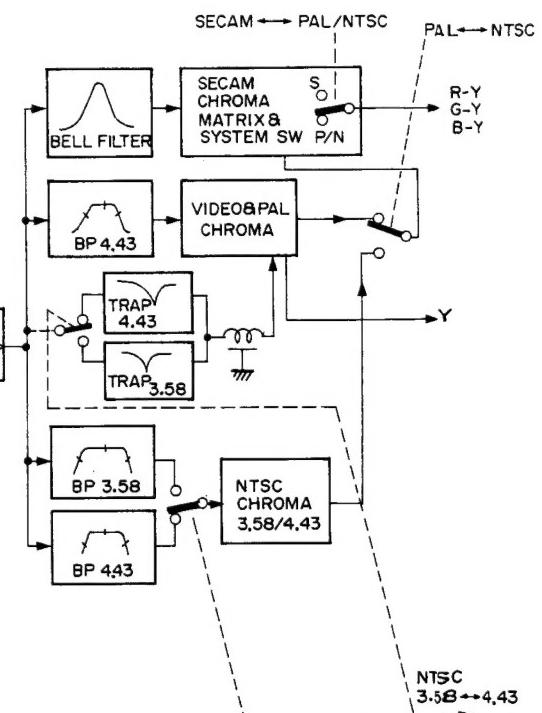
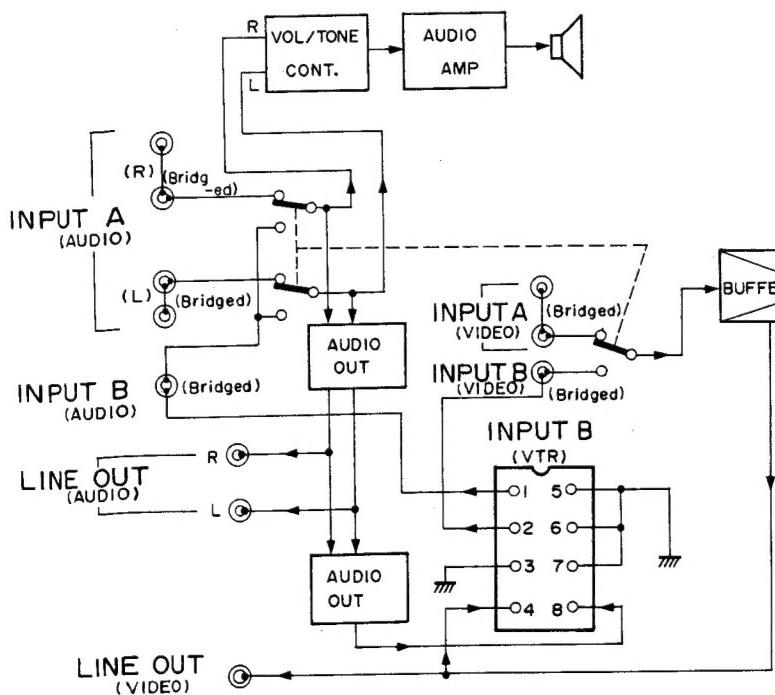
#### (1) Switching PAL, SECAM and NTSC

The voltage used for automatic switching is forcibly applied to the circuit, switching the change-over switch to the desired colour system.

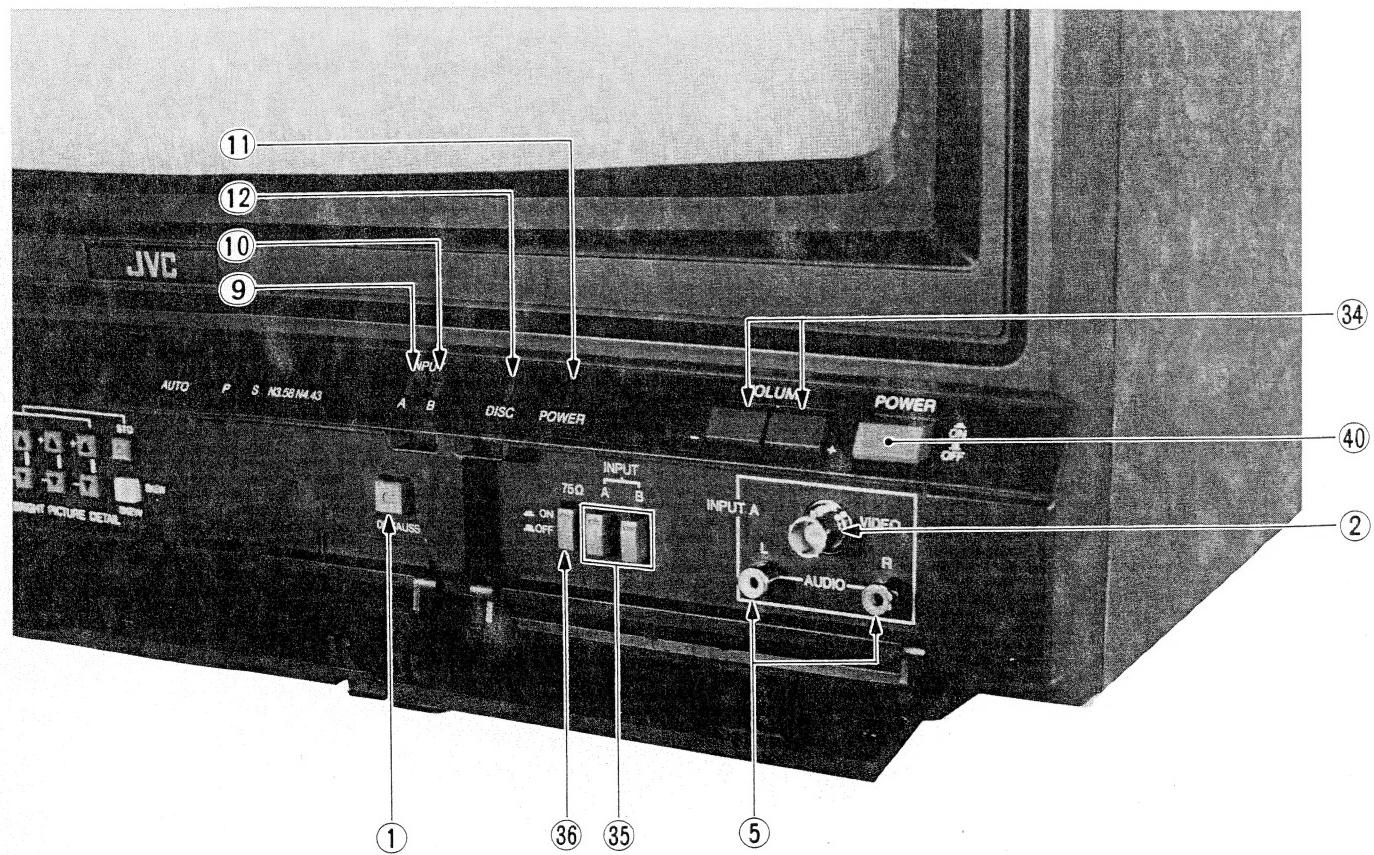
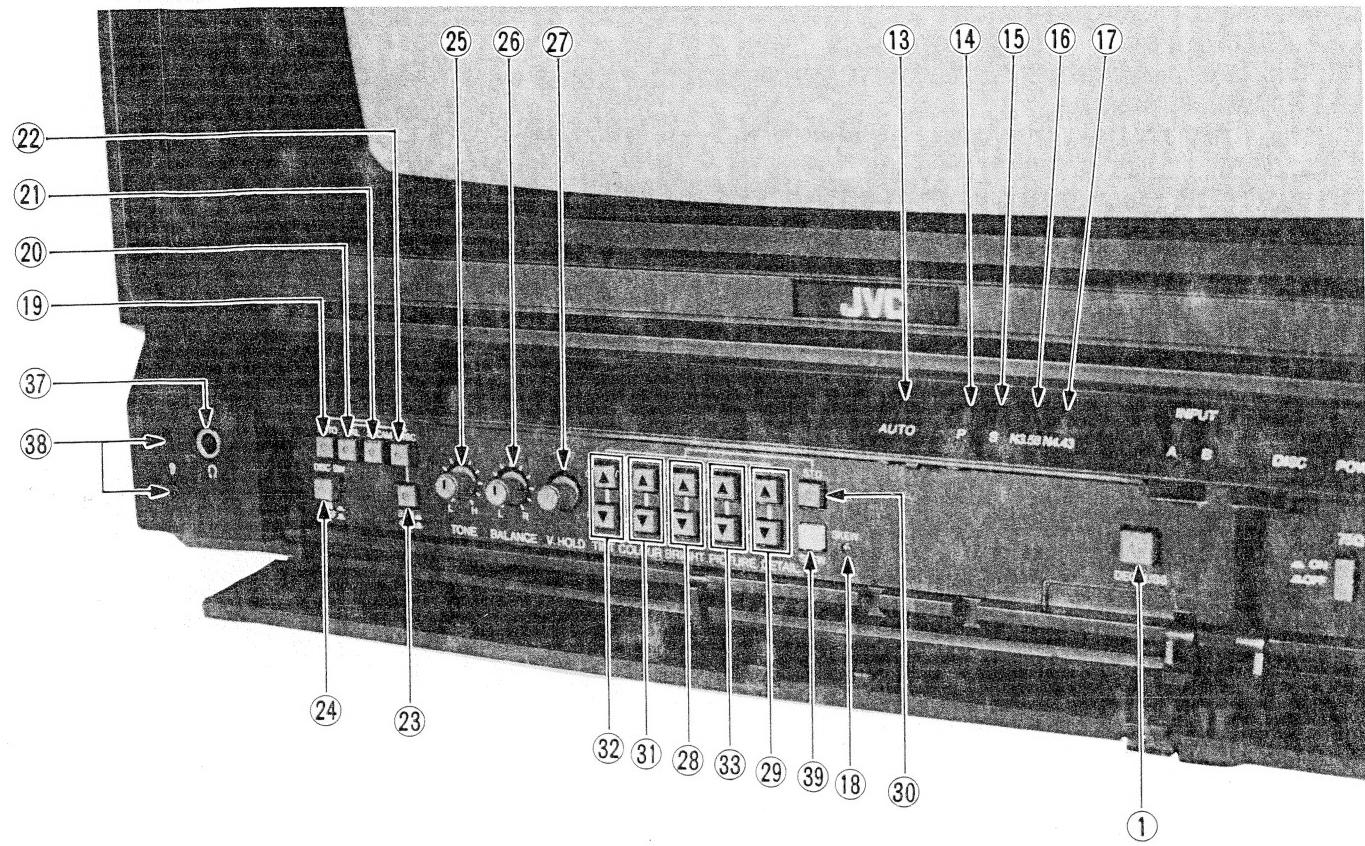
#### (2) Switching NTSC system 3.58/4.43

The switch circuit is operated with the 3.58/4.43 change-over switch for the system selected by BPT, or trap.

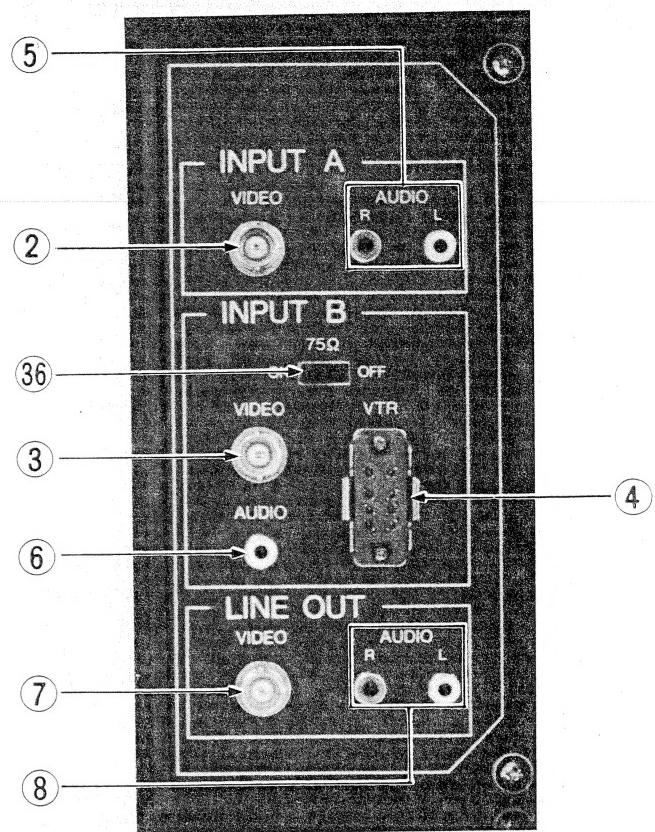
[Block Diagram]



## 4. FUNCTIONS



- |   |                        |
|---|------------------------|
| 1. Deg. Switch                            | 21. SECAM SWITCH       |
| 2. VIDEO IN-A                             | 22. NTSC SWITCH        |
| 3. VIDEO IN-B                             | 23. N3.58/N4.43 SWITCH |
| 4. VTR TERMINAL<br>(VTR IN/OUT Connector) | 24. DISC SWITCH        |
| 5. AUDIO IN-A                             | 25. V. HOLD CONTROL    |
| 6. AUDIO IN-B (MONO)                      | 26. BALANCE CONTROL    |
| 7. VIDEO LINE OUT                         | 27. TONE CONTROL       |
| 8. AUDIO LINE OUT                         | 28. BRIGHT CONTROL     |
| 9. INPUT A IND.                           | 29. DETAIL CONTROL     |
| 10. INPUT B IND.                          | 30. STD CONTROL        |
| 11. POWER IND.                            | 31. COLOUR CONTROL     |
| 12. DISC. IND.                            | 32. TINT CONTROL       |
| 13. AUTO IND.                             | 33. PICTURE CONTROL    |
| 14. PAL IND.                              | 34. VOL. CONTROL       |
| 15. SECAM IND.                            | 35. INPUT A/B SWITCH   |
| 16. NTSC (3.58) IND.                      | 36. 75Ω BRIDGE OUT SW. |
| 17. NTSC (4.43) IND.                      | 37. HEADPHONE JACK     |
| 18. SKEW IND.                             | 38. EARPHONE JACK      |
| 19. AUTO SWITCH                           | 39. SKEW SWITCH        |
| 20. PAL SWITCH                            | 40. POWER SWITCH       |



### ■ SKEW SWITCH

Compensates partially skewed screen display on the screen that appears during VTR playback, caused by tape deterioration or other factors.

### ■ DISC SWITCH

When a video disc with 50 Hz (PAL/SECAM) vertical synchronous frequency is under playback on a video disc player (VHD), this switch performs automatic frequency changeover to prevent vertical run of pictures.

ON: Automatically switches 50 Hz to 60 Hz.  
OFF: Copes with 60 Hz (NTSC) video disc.

### ■ VIDEO IN A

The terminal for monitoring by connecting the video output from a video camera, VTR, or video disc player (VHD).

A bridge connection is applied to INPUT A at the front and rear sides, enabling a bridge connection by using the two terminals.

### ■ VIDEO IN B

The terminal for monitoring by connecting the video output from a video camera, VTR, or video disc player (VHD).

When input signals exist at the VTR connector, this terminal functions as the bridge output terminal.

### ■ VIDEO LINE OUT

The terminal used when recording into a VTR or other equipment. Output from this terminal are the video signals input into the VIDEO IN A/B and the VTR connector.

### ■ AUDIO IN A (STEREO)

The terminal for monitoring by connecting the audio output from a video camera, VTR, or video disc player (VHD).

A bridge connection is applied to INPUT A at the front and rear sides, enabling a bridge connection by using the two terminals.

### ■ AUDIO IN B (MONO)

The terminal for monitoring by connecting the video output from a video camera, VTR, or video disc player (VHD).

When input signals exist at the VTR terminal, this terminal functions as the bridge output terminal.

### ■ AUDIO LINE OUT

The terminal used when recording into a VTR or other equipment. Output from this terminal are sound signals input into the AUDIO IN A/B and the VTR connector.

### ■ VTR connector (8PIN)

A/V IN OUT connector for connection with video equipment.

When input signals exist at the INPUT B, the bridge output is input into the pins ① and ②; however, those do not function as the bridge output terminal.

### ■ 75Ω SWITCH

Turn this switch OFF when used by applying bridge connection. For other uses, keep it ON.

**NOTE:** Do not use the bridge terminal as an input terminal at the same time.

# 5. SERVICE ADJUSTMENTS

## PICTURE TUBE

The picture tube is a precision in-line gun type. For this picture tube, dynamic convergence is carried out by a precision deflection yoke which eliminated the use of convergence yoke and convergence circuit. The adjustment of picture tube is therefore made easier as only the adjustment of static convergence by using a magnetic is enough. The deflection yoke and purity/convergency magnets assembly has been set at the factory and requires no field adjustments.

However, should the assembly be accidentally jarred or tampered with, some or all adjustments may be necessary.

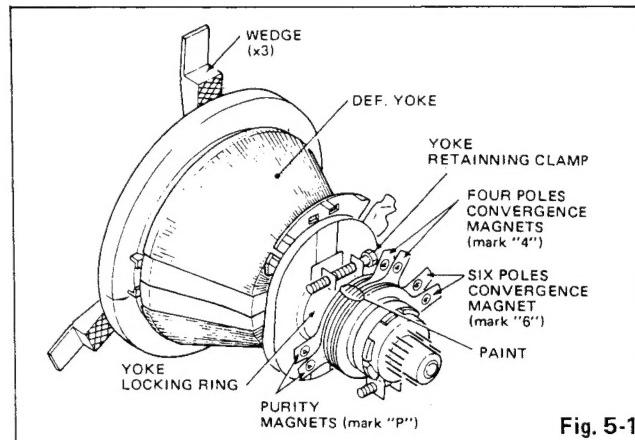


Fig. 5-1

## COLOUR PURITY & VERTICAL CENTER

Loosen yoke retaining clamp (Fig. 5-1). With a sharp knife cut between the picture tube and the bond. Remove wedges completely and clean off dried adhesive from the picture tube. PAINT is used to lock the tabs of the purity/convergence magnet assembly in place (Fig. 5-1). The paint must be removed with the end of a screwdriver before any adjustments are attempted.

1. Display a monochrome pattern.
2. Let the purity tabs come in line horizontally as is shown in Fig. 5-3. A long tab should be in the same direction as the other short tab.
3. Move the yoke slowly backward.
4. Turn the green cut-off control to maximum and the red and blue cut-off controls to minimum. Then adjust the screen control so that the green band can be seen best. (Fig. 5-2, 4)
5. Rotate the two tabs in the opposite directions and with them kept at an angle, together in either direction so that the green band is centered on the picture tube.
6. Check the vertical center position by displaying a horizontal line. Unless correct, bring it to the center by rotating the two tabs, kept at an angle, together in either direction (Fig. 5-5, 6)
7. Repeat steps 5 and 6 alternately until the green band and the vertical center come to the center.
8. Move the yoke slowly towards the bell of the tube so that the whole surface of the picture tube is filled with a green pure raster.
9. Turning red or blue cut-off control to maximum, and green cut-off control to minimum, make sure of a red or blue pure raster.
10. Secure yoke retaining clamp (do not install wedges at this time).

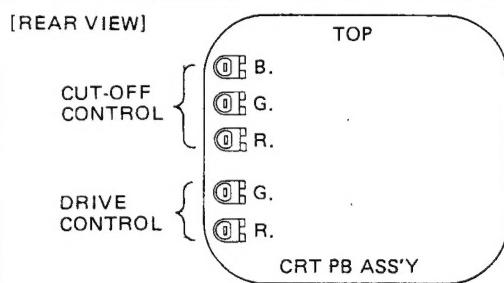


Fig. 5-2

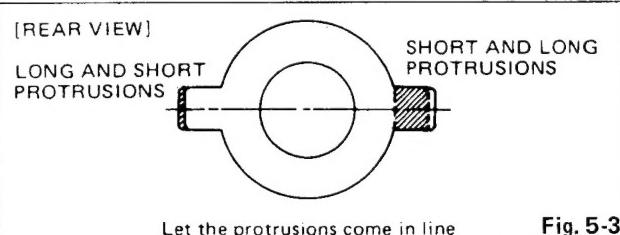


Fig. 5-3

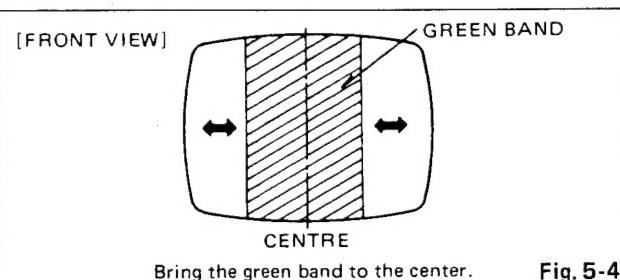


Fig. 5-4

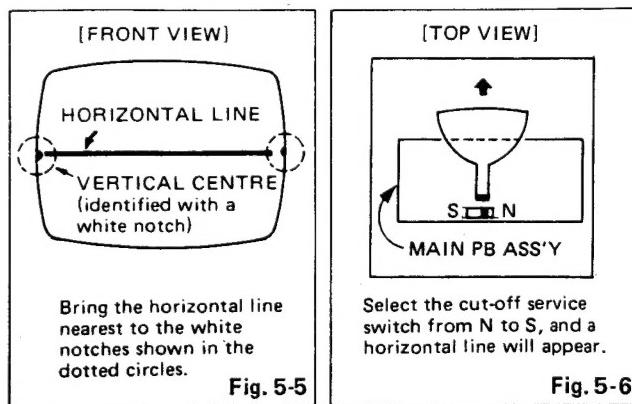


Fig. 5-5

Fig. 5-6

## STATIC CONVERGENCE & DYNAMIC CONVERGENCE

Static convergence is achieved by four magnets located on the neck, nearest the base of the picture tube. The front pair of magnetic rings (closest to the purity tabs) are adjusted to converge the red and blue crosshatch lines.

The rear pair of convergence rings (closest to the base of the picture tube) are adjusted to converge the magenta (R/B) and green crosshatch lines.

Dynamic convergence is achieved by tilting the deflection yoke, Up-Down and Left-Right.

1. Display a crosshatch pattern, and adjust BRIGHTNESS and CONTRAST control for a distinct pattern.
2. Adjust the convergence around the edges of the picture tube by tilting the yoke, up-down and left-right, and temporarily install one wedge at the top of the yoke. (Fig. 5-9, 10, 11)
3. Rotate the front pair of tabs as a unit to minimize the separation of the red and blue lines around the center of the screen. To adjust the convergence of red and blue, vary the angle between the tabs. (Fig. 5-7)
4. Rotate the rear pair of tabs as a unit to minimize the separation of the magenta (R/B) and green lines. (Fig. 5-8)
5. Adjust the spacing of the rear tabs to converge the magenta and green lines.
6. Apply paint to fix 6 magnets.
7. Remove the wedge installed temporarily on the yoke.
8. Tilting the angle of the yoke up, down and sideways, and adjust the yoke so as to obtain the circumference convergence. (Fig. 5-10, 11)
9. Insert three wedges to the position as shown in Fig. 5-12. to obtain the best circumference convergence.
10. Wedge has a backing of double sided adhesive tape. Therefore, tear off one side of adhesive tape, and fix the wedges.
11. White balance adjustment (Black & White tracking) can now be performed.

## WHITE BALANCE ADJUSTMENT

### (Black and White Tracking)

1. Display a monochrome pattern.
2. Set the red and green drive controls for their mechanical center (Fig. 5-2).
3. Turn the red, green and blue cut-off controls and the screen control fully counterclockwise.
4. Select a service switch as shown in Fig. 5-6.
5. Turn screen control slowly clockwise until a very faint horizontal line appears.
6. Turn the cut-off control of the colour which has appeared first, clockwise by about  $10^\circ$  and then adjust the screen control again so that the colour may shine faintly.
7. Turn the other colour cut-off controls slowly clockwise until a reasonable white line appears.
8. Return a service switch to normal position. (Fig. 5-6)
9. Adjust the red and green drive controls for best white highlights.

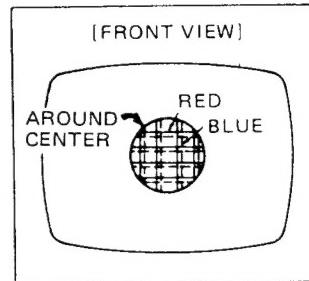


Fig. 5-7

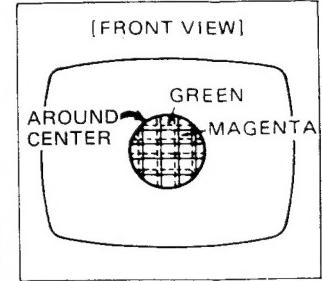


Fig. 5-8

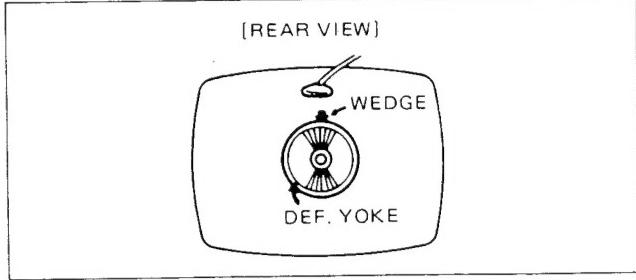


Fig. 5-9

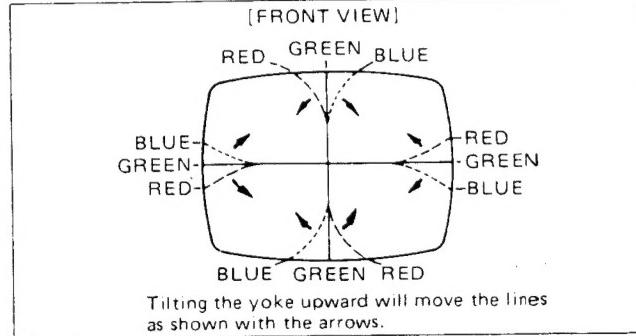


Fig. 5-10

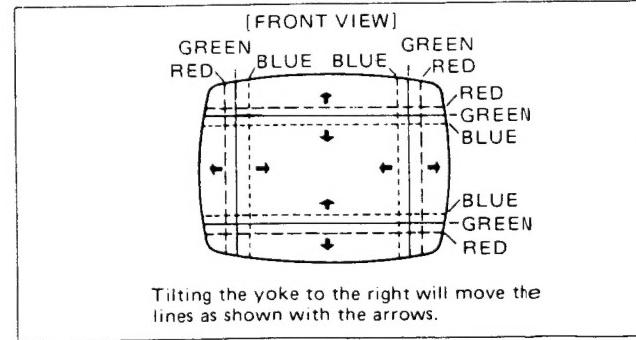


Fig. 5-11

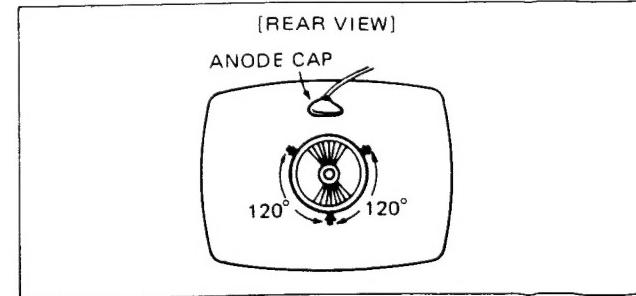


Fig. 5-12

## ALIGNMENT LOCATION

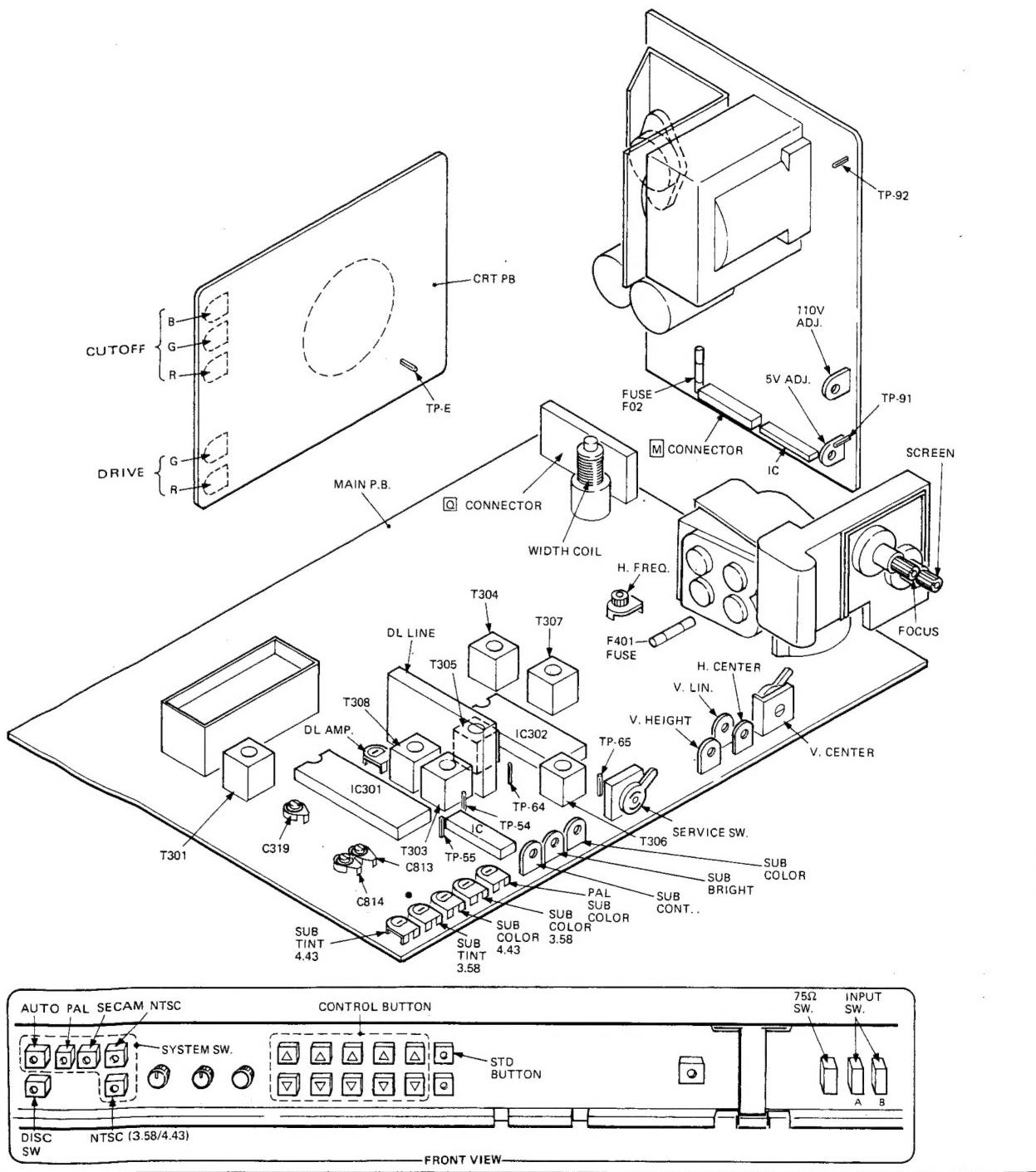


Fig. 5-13

**B1 POWER SUPPLY (110V)**

The regulated +B<sub>1</sub> control (See R9012, Fig. 5-13) has been factory adjusted and normally requires no adjustment. However, if any repairs have been made to the chassis it's recommended that this adjustment should be made.

1. Allow 5 minutes to warm up.
2. Display a colour signal.
3. Connect an accurate D.C. voltmeter to TP-92 and earth.
4. Adjust 110V ADJ. VR (R9012) for a reading of following D.C. voltage.

**Note:** Should +B<sub>1</sub> control be set too high, it may cause

possible component damage. Using a simple voltmeter, it must be calibrated.

B1 Voltage	110 V
------------	-------

**DC 5V VOLTAGE**

Display a colour signal, and regulate 5V ADJ. VR (R9028) for DC 5V Voltage adjustment so that DC voltage between TP-91 and earth become 5V. (See Fig. 5-13)

**Note:** The tester used should be periodically calibrated at 20 kΩ/V.

**FOCUS**

Adjust FOCUS control for best overall definition and picture detail at normal brightness and contrast.  
(See Fig. 5-13)

**HORIZONTAL OSCILLATOR**

1. Set the H. FREQ. VR to the mechanical center position.
2. Connect a jumper clip between (10) pin of IC501 and earth.
3. Connect a freq. counter with probe to (15) pin of IC501 and earth.
4. Adjust the H. FREQ. VR so that the oscillation freq. is 15.625 kHz.
5. Remove the jumper clip and the freq. counter.
6. Then confirm that there is no abnormality in all the channels.

**SUB CONT AND SUB BRIGHT**

1. Display a colour signal.
2. Press the standard button.
3. Then align both the SUB CONT and SUB BRIGHT VR's in the Main PB ass'y until an ideal picture is obtained.

**VERTICAL AND HORIZONTAL CENTER**

Centering is completed at the factory, although it may become distorted when CRT is changed.  
In such case, moving the V. CENT. switch moves the picture up or down, and adjusting the H. CENT. control moves the picture left or right.

**VERTICAL HEIGHT & LINEARITY**

1. Display a crosshatch or a pattern with which symmetry can be checked.
2. Reduce the vertical size with the V. HEIGHT control.
3. Adjust the vertical symmetry with the V. LIN. control.
4. Readjust the V. HEIGHT so that the picture extends to normal size.

**HORIZONTAL WIDTH**

Adjust H. WIDTH control coil (L1501) by turning it with a hexagonal adjusting bar only if RIGHT and LEFT sides of pictures can't be seen.

**NTSC COLOUR CIRCUIT**

(See : Fig. 5-13)

**SUB TINT AND SUB COLOUR (3.58 MHz)**

1. Press the system switch to NTSC.
2. Press the standard button.
3. Turn the 3.58/4.43 select switch to 3.58 position.
4. Adjust the 3.58 SUB COLOUR VR and the 3.58 SUB TINT VR to obtain the most natural colour.

**SUB TINT AND SUB COLOUR (4.43 MHz)**

1. Press the system switch to NTSC.
2. Press the standard button.
3. Turn the 3.58/4.43 select switch to 4.43 position.
4. Adjust the 4.43 SUB COLOUR VR and 4.43 SUB TINT VR to obtain the most natural colour.

**COLOUR SYNC (3.58 MHz)**

1. Press the system switch to NTSC.
2. Turn the 3.58/4.43 select switch to 3.58 position.
3. Display a colour bar signal.
4. Connect two jumper clips between pin (8) of IC801 and earth and between pin (15) of IC801 and pin (12) of IC801.
5. While rotating a trimmer condenser (C1814) using a nonmetallic screwdriver, adjust it until the horizontal striped patterns with colour become stationary or are slowly moving.
6. Remove the two jumper clips.

**COLOUR SYNC. (4.43 MHz)**

1. Press the system switch to NTSC.
2. Turn the 3.58/4.43 select switch to 4.43 position.
3. Display a colour bar signal.
4. Connect two jumper clips between pin (8) of IC801 and earth and between pin (15) of IC801 and pin (12) of IC801.
5. While rotating a trimmer condenser (C1813) using a nonmetallic screwdriver, adjust it until the horizontal striped patterns with colour become stationary or are slowly moving.
6. Remove the two jumper clips.

**SUB COLOUR (PAL and SECAM)**

- Display a colour signal (PAL or SECAM).
- Press the standard button.
- Adjust the SUB COLOUR VR (PAL SUB COLOUR VR in PAL, SUB COLOUR VR in SECAM) to obtain the most natural colour.

**SECAM COLOUR CIRCUIT**

See : Fig. 5-13

- Press the system switch to SECAM.
- Display a SECAM colour bar signal. Press the standard button.
- Connect 10:1 probe of oscilloscope to pin 27 of IC302.
- Adjust T304 for the waveform shown in Fig. 5-15.
- Connect V.T.V.M. between pin 26 of IC302 and earth, and then adjust T307 so that the voltage become to maximum.
- Connect probe of oscilloscope to TP-64 and adjust T305 for the waveform shown in Fig. 5-16.
- Connect probe of oscilloscope to TP-65 and adjust T306 for the waveform shown in Fig. 5-17.

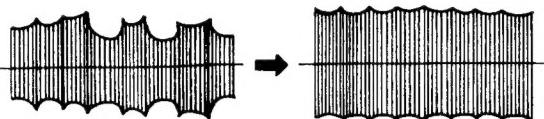


Fig. 5-15

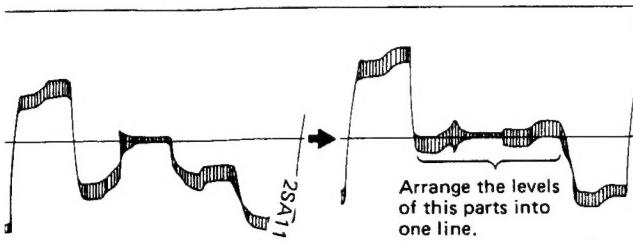


Fig. 5-16

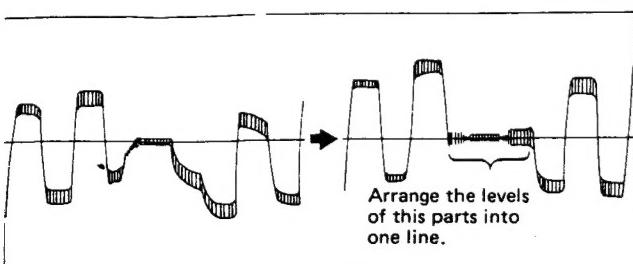


Fig. 5-17

**PAL COLOUR CIRCUIT**

(See : Fig. 5-13)

**DL-MATRIX**

Note: Do the SECAM adjustment before the PAL adjustment.

- Press the system switch to PAL.
- Display a PAL colour bar signal. Press the standard button.
- Set the oscilloscope to X-Y range, and connect its X-probe to TP-54 and its Y-probe to TP-55.
- Connect jumper clip between pin ④ of IC301 and pin ⑤ of IC301.
- Apply bias +12V to pin ⑥ of IC301.
- Adjust T302 to minimize resurge waveforms on the oscilloscope. [See : Fig. 5-18-(A)]
- Adjust R348 (DL AMP) for the absence of loops and adjust T308 so that each pair of lines marge together.
- Adjust C319 to just regain floating colour synchronization.
- Remove the short jumper between pin ④ and pin ⑤ of IC301.
- Adjust T303 to maximize waveforms on the oscilloscope.

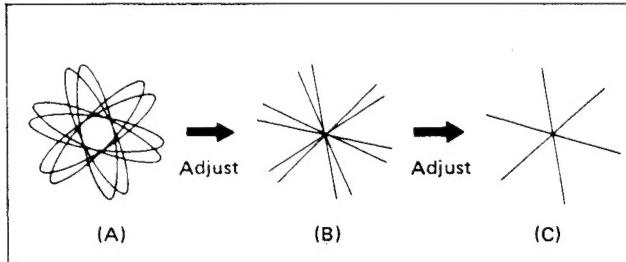


Fig. 5-18

**COLOUR SYNC**

- Display a PAL colour bar signal.
- Apply bias +12V to pin ⑥ of IC301.
- Connect a jumper clip between pin ④ of IC301 and pin ⑤ of IC301.
- While rotating a trimmer condenser (C319) using a nonmetallic screwdriver, adjust it until the horizontal striped patterns with colour become stationary or are slowly moving.
- Remove a jumper clip.

## 6. REPLACEMENT PARTS LIST

### PRODUCT SAFETY NOTE

Components identified by the  symbol in the PARTS LIST and the shaded areas on the Schematic have special characteristics important to safety. Before replacing any of these components read carefully the SAFETY PRECAUTION on Page 2 of this Service Manual. DO NOT degrade the safety of the set through improper servicing.

### 1. ABBREVIATED WORD OF RESISTORS AND CAPACITORS

#### RESISTOR

C R	Carbon Resistor
Comp. R	Composition Resistor
OM R	Oxide Metal Film Resistor
V R	Variable Resistor
M F R	Metal Film Resistor
UNF R	Unflammable Resistor

F R	Fusible Resistor
CH MG R	Chip Metal Glaze Resistor

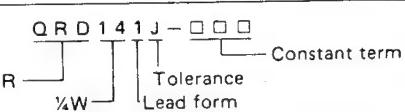
#### CAPACITOR

C Cap..	Ceramic Capacitor
M Cap.	Mylar Capacitor
E Cap.	Electrolytic Capacitor

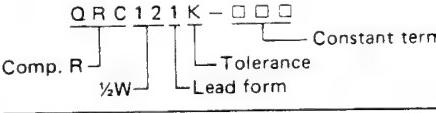
BP E Cap..	Bi-Polar (or Non-Polar) Electrolytic Capacitor
MM Cap.	Metalized Mylar Capacitor
PP Cap.	Polypropylene Capacitor
MPP Cap.	Metalized PP Capacitor
PS Cap.	Polystyrol Capacitor
Tan. Cap.	Tantalum Capacitor
CH C Cap..	Chip Ceramic Capacitor

### 2. FOLLOWING RESISTORS AND CAPACITORS OF STANDARD ELECTRICAL COMPONENTS ARE OMITTED FROM THIS PARTS LIST. EACH PART NUMBER OF THESE STANDARD REPLACEMENT COMPONENTS IS DEFINED AS FOLLOWS.

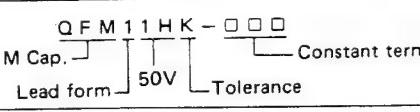
Carbon Resistor (C R): Lead form (  )

Rating	Part No.
1/4W	
1/2W	QRD121J - □ □ □

Composition Resistor (Comp. R): Lead form (  )

Rating	Part No.
1/2W	

Mylar Capacitor (M Cap.): Lead form (  )

Withstand Voltage	Part No.
50V	
100V	QFM42AK - □ □ □
200V	QFM42DM - □ □ □

### 3. DECODING OF TOLERANCE AND CONSTANT TERM

#### TOLERANCE

J: ±5% K: ±10% M: ±20% N: ±30% H: +50%  
-10%

Z: +80% P: +100% R: +30%  
-20% -0% -10%

#### CONSTANT TERM

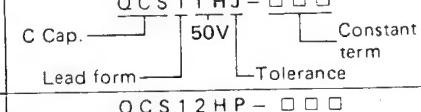
• Carbon Resistor (1/4W, ±5% Tolerance)

QRD141J - □ □ □

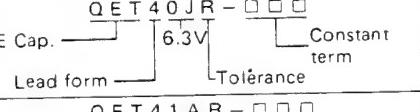
#### CONSTANT TERM.

- □ □ □	2.7Ω → QRD141J-2R7
↑ ↑ ↑	
1 R 0	→ 1.0Ω
⋮ ⋮ ⋮	
9 R 7	→ 9.7Ω
— — —	
1 0 □	→ 10□ means $10 \times 10^0$ (Ω)
⋮ ⋮ ⋮	
8 2 □	→ 82□ means $82 \times 10^0$ (Ω)

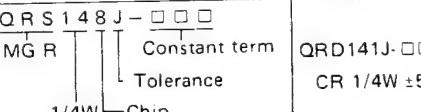
Ceramic Capacitor (C Cap.): Lead form (  )

Withstand Voltage	Parts No.
50V	
500V	QCS12HP - □ □ □

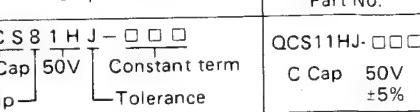
Electrolytic Capacitor (E Cap.): Lead form (  )

Withstand Voltage	Parts No.
6.3V	
10V	QET41AR - □ □ □
16V	QET41CR - □ □ □
25V	QET41ER - □ □ □
50V	QET41HR - □ □ □

Chip Metal Glaze Resistor (CH MG R)

Chip name	Chip No.	Substitutional Part No.
CH MG R		QRD141J-□□□ CR 1/4W ±5%

Chip Ceramic Capacitor (CH C Cap.)

Chip name	Chip No.	Substitutional Part No.
CH C Cap		QCS11HJ-□□□ C Cap 50V ±5%

• Ceramic Capacitor (50 Volts, ±5% Tolerance)

QCS11HJ - □ □ □

#### CONSTANT TERM.

- □ □ □	5pF → QCS11HJ-5R0
↑ ↑ ↑	
1 R 0	→ 1.0pF
⋮ ⋮ ⋮	
8 R 0	→ 8.0pF
— — —	
1 0 □	→ 10□ means $10 \times 10^0$ (pF)
⋮ ⋮ ⋮	
8 8 □	→ 88□ means $88 \times 10^0$ (pF)

## S-1804A (Main P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>VARIABLE RESISTOR</b>									
R1219		QVZ3230-024	VR (Sub Cont.)	20kΩ B	L1202		A76186-33	Peaking Coil	33μH
1223		" -024	" (Sub Bright)	" "	1203		" -27	"	27μH
1313		CEX40053-024	" (PAL/Sub Colour)	" "	1204		" -180	"	180μH
1328		QVZ3230-014	" (Sub Colour)	10kΩ B	1301		" -4.7	"	4.7μH
1348		CEX40053-053	" (DL Amp.)	5kΩ "	1302		" -8.2	"	8.2μH
1421		QVZ3230-022	" (V. Lin.)	200Ω "	1304		A49468-562	"	5600μH
1422		" -022	" (V. Height)	" "	1305		A76186-15	"	15μH
1506		" -022	" (H. Center)	" "	1501		CE40140-00A	W. Coil	
1509		CEX40054-053	" (H. Freq.)	5kΩ B	1502		A39835	Linearity Coil	
1821		CEX40053-014	" (4.43 Sub Tint)	10kΩ "	1503		CJ30030-022	Heater Choke Coil	
1823		" -014	" (3.58 Sub Tint)	" "	1802		A76186-8.2	Peaking Coil	8.2μH
1827		" -024	" (3.58 Sub Colour)	20kΩ "	1803		" -4.7	"	4.7μH
1829		" -024	" (4.43 Sub Colour)	" "	1804		" -180	"	180μH
					1805		" -680	"	680μH
					~ 8				
<b>RESISTOR</b>									
R1416	△	QRD149J-560S	C R	56Ω 1/4W J	T1301		A75325	BP Transf.	
1427		QRG029J-561A	OM R	560Ω 2W "	1302		CE40359	Burst Cleaning	
1428		" -471A	"	470Ω "	1303		"	Phase Transf.	
1435		" -471A	"	" "	1304		CE40357	Bell Transf.	
1436		QRX029J-3R9A	MF R	3.9Ω "	1305		CE40358	Descri. Transf.	
1451		" -3R9A	"	" "	1306		"	"	
1462	△	QRD149J-560S	C R	56Ω 1/4W "	1307		CE40359	Ident. Transf.	
1517		QRG019J-101S	OM R	100Ω 1W "	1308		CE40371-001	DL P Transf.	
1521		QRX019J-1R5S	MF R	1.5Ω "	1401		A39864-B	Side Pin Transf.	
1522	△	QRX039J-8R2	"	8.2Ω 3W "	1501		CE40203-00A	Drive Transf.	
1523		QRX029J-3R9A	"	470Ω 1W "	1801		A75196-B	3.58 BP Transf.	
1526		QRG019J-102S	OM R	1kΩ 1W "	1802		A75325	BP Transf.	
1529		QRG029J-822	"	8.2kΩ 2W "					
1531		QRG019J-471S	"	470Ω 1W "					
1536		QRX029J-3R3A	M FR	3.3Ω 2W "					
1551	△	ORV141F-7681	MF R	7.68kΩ 1/4W ±1%					
1552	△	ORV141F-8061	MF R	8.06kΩ "					
<b>CAPACITOR</b>									
C1316		QEN61HM-105Z	BP E Cap.	1μF 50V M	D1203,6		W06A	Si. Diode	
1319		QAT3001-010	Trimmer Cap.		1204		1S1555	"	
1320		QCT81CH-390YL	Chip Cap.	39pF	1205		MA26W0(B)	"	
1321		QCT81RH-680YL	"	68pF	1301		1S1555	"	
1305		QEB51HM-224M	E Cap.	0.22μF 50V M	~ 3				
1336		QCT81UJ-330YL	Chip Cap.	33pF	1304		1N60	Ge. Diode	
1337		" -560YL	"	56pF	1305		1S1555	Si. Diode	
1342		" -330YL	"	33pF	1306		RD8.2E(B1)	Zener Diode	
1343		QCT81TH-680YL	"	68pF	1308		1S1555	Si. Diode	
1404		QFZ0083-104MZ	Mylar Cap.	0.1μF 50V K	~ 11				
1406		QEE51VK-685B	Tan Cap.	6.8μF 35V K	1401		RD9.1E(B2)	Zener Diode	
1407		QEM51CM-477M	E Cap.	470μF 16V M	1403		1SS81	Si. Diode	
1408		QEH61HM-106Z	"	10μF 50V "	1404		1N4003	"	
1409		QEE51VK-685B	Tan Cap.	6.8μF 35V K	1405		"	"	
1412		QEH51CM-108M	E Cap.	1000μF 16V M	1406		V19G	"	
1418		QEH52CM-475M	"	4.7μF 160V "	1407		RD36E(B)	Zener Diode	
1428		QEH51CM-477M	"	470μF 16V "	1408		1SS82	Si. Diode	
1505		QET52CR-336	"	33μF 160V R	1409		1S1555	"	
1513		QFP31HJ-562S	PP Cap.	5600pF 50V J	1410		RD13E(B)	Zener Diode	
1520	△	QFZ0081-9201S	MPP Cap.	9200pF 160V ±3%	1501	△	1S1555	Si. Diode	
1521	△	QFM72AK-184M	Mylar Cap.	0.18μF 100V K	1502		HZ7B2LV1	Zener Diode	
1522		QET52CR-336	E Cap.	33μF 160V R	1503		RD11E(B)	"	
1523		QFZ0082-202S	MPP Cap.	2000pF	1504		1SS81	Si. Diode	
				DC1600V J	1505		U19E	"	
1524		QFZ0067-534S	"	0.53μF 200V K	1506		V09E	"	
1525		QEM51CM-108M	E Cap.	1000μF 16V M	1507		"	"	
1530		QEM51HK-475M	"	4.7μF 50V K	1508		U19E	"	
1813		QAT3001-010	Trimmer Cap.		1509		RH-1B	"	
1814		" -010	"		1510		1S1555	"	
					1511		RM-2C	"	
					1513		RD12E(B)	Zener Diode	
					1514		RD11E(B)	"	
					1515		"	"	
					1516		1S1555	Si. Diode	
					~ 7				

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
D1518 1702 ~ 6 1801 ~ 4 1805		MA26W0(B) 1S1555 1S1555 RD5.6E(B)	Si. Diode " " Zener Diode		Q1701 ~ 8 1801 1803 ~ 9 1810 1811		2SC1815(Y,GR) " " 2SA1015(Y,GR) "	Si. Transistor " " Transistor "	
<b>TRANSISTOR</b>									
Q1203 1206 1208 1251 1302 ~ 7 1401 1402 1405 1406 1407 1408 1409 1410 1430 1501 1502 1503 1505 ~ 6 1507 ~ 8		2SC1213(C) 2SC1815(Y,GR) 2SA673(C) 2SC1815(Y,GR) " " " 2SA1015(Y,GR) 2SC3187 2SA1013(R,O) 2SD866B(P,Q) 2SD401A(K) 2SC1815(Y,GR) " " " " " " " 2SC1627A 2SA1015(Y,GR) 2SC1815(Y,GR)	Si. Transistor " " " " " " " " " Transistor Si. Transistor " " " " " " " " " Transistor Si. Transistor		IC IC1301 1302 1303 1401 1501 1801		M51395AP M51397AP TC4066BP AN5560 HA11423 HA11247	IC " " " " " "	
<b>OTHER</b>									
F1401 FR1401 1402 DL1201 1301 S1401 R1459 Y1301 1801 1802 S1201	△ △ △	QMF51E2-1R0S QRH127J-152M " -2R2M <b>CE40178-001</b> <b>A76350</b> CEX40078-001 ERZ-C05ZK471 <b>CE40479-001</b> <b>CE40479-001</b> <b>CE40479-001</b> CEX40078-001	Fuse F R " <b>Delay Line</b> <b>1H Delay Line</b> <b>Lever Switch</b> Z N R Crystal " " " Lever Switch	1A 1.5kΩ 1/2W J 2.2Ω " " V. Center Service SW.					

SS-3036A (CRT Socket P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>VARIABLE RESISTOR</b>					<b>COIL</b>				
R3102		<b>CEX40202-053</b>	VR (G. Cutoff)	5kΩ B	L3101		<b>QQL043K-221</b>	Peaking Coil	220μH
3104		" -053	" (R. Cutoff)	" "	3102		A04725-220	"	"
3106		" -053	" (B. Cutoff)	" "	~ 4				
3108		" -022	" (G. Drive)	200Ω "					
3110		" -022	" (R. Drive)	" "					
<b>RESISTOR</b>					<b>DIODE</b>				
R3113		QRG029J-123	OM R	12kΩ 2W J	D3102		RM-2C	Si. Diode	
3114		" -123	"	" "					
3115		" -123	"	" "					
3116		QRZ0039-332	Comp R	3.3kΩ ½W K					
3118		" -332	"	" "					
3120		" -332	"	" "					
3138		ERZ-C05ZK271	Z N R						
<b>CAPACITOR</b>					<b>TRANSISTOR</b>				
C3104		QET52ER-106	E Cap.	10μF 250V R	Q3101		2SC1514VC	Si. Transistor	
3106		" -105	"	1μF " "	~ 3				
3107		QCZ9017-102M	C Cap.	1000pF 3kV P					
3109		QET52ER-106	E Cap.	10μF 250V R					
					<b>OTHER</b>				
					FR3128	△	QRH127J-470M	F R	47Ω ½W J
						△	A75522-F	CRT Socket	

**SS-4204A (System SW. P.B. Ass'y)**

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>VARIABLE RESISTOR</b>									
R4219		CEX40089-B14	VR (Balance)	10kΩ B			DIODE		
4221		CEX40088-B14	" (Tone)	" "	D4201		1S1555	Si. Diode	
4223		" -A14	" (V. Hold.)	" A	~ 6		"	"	
					4210				
					~ 12				

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>TRANSISTOR</b> Q4201 4203 ~ 5		2SA1015(Y,GR) 2SC1815(Y,GR)	Transistor Si. Transistor		<b>OTHER</b> SW4201 4202 4203		CEX40015-007 " -005 " -005	Push SW. " " "	System SW.(AUTO/ PAL/SECAM/NTSC) N3.58 – N4.43 Disc

## SS-4205A (Front Control P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>RESISTOR</b> R4173 4174 4175		QRB041K-103 " -823 " -823	Resistor Network	10kΩ 1/8W K 82kΩ " " " " "	<b>IC</b> IC4141 4142 4143		MN1541AVVM TC4049BP TC4050BP	IC " " " "	
<b>CAPACITOR</b> C4150 4151		QCNB41M-102A " -102A	Capacitor Block	1000pF 50V M " " "	<b>OTHER</b> CF4141 S4104 4106 4107 4108 4109 4110 4112 4113 4115 4116 4117 4118		CSB500A A76103-C " " " "	Ceramic Filter Key Board SW.	SKEW Tint (Green) Tint (Red) Picture-Up Picture-Down STD Detail " " Bright-Up Bright-Down Colour-Up Colour-Down
<b>DIODE</b> D4103 4141 ~ 4 4146 4147		LN31GCP-UHL 1S1555 " RD4.7E(B3)	LED Si. Diode " Zener Diode	SKEW					
<b>TRANSISTOR</b> Q4144 4145		2SC1815(Y,GR) 2SA1015(Y,GR)	Si. Transistor Transistor						

## SS-4601A (A/V Selector P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>SWITCH</b> S4601		CEX40086-007	Push Switch		S4603 4604		A76103-C A76103-C	Key Board SW " "	Volume Up Volume Down

## SS-8505A (Sensor/Audio Out P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>RESISTOR</b> R8700 8713 8731 8723		QRB041K-103 " -823 " -103 " -103	Resistor Network	10kΩ 1/8W K 82kΩ " " 10kΩ " " " " "	D8783 8787		MA165 " "	Si. Diode " "	
<b>CAPACITOR</b> C8561 8566 8571 8574 8579 8580 8581 8589 8590 8715 8902		QFZ0083-104M " -104M QEB51HM-104M " -104M QFV81HJ-104M " -104M QEY71ER-228M QEB51HM-104M " -104M QETB1AM-227 QEM41AM-108M	Mylar Cap. E Cap. TF Cap. E Cap.	0.1μF 50V K " " " " " " " " " 2200μF 25V R 0.1μF 50V M " " " " " " 220μF 10V M 1000pF 16V M	O8553 8702,3 8731 ~ 8 8901		2SD637(Q,R) 2SC1815(Y,GR) " " 2SC1815(Y,GR)	Transistor Si. Transistor " " " "	
<b>DIODE</b> D8551 8711 8712 8713 8731 ~ 5		MA165 " " MA4270(M) MA165	Si. Diode " " Zener Diode Si. Diode		<b>IC</b> IC8552 8553 8701 8711 8712		TA7630P AN7168 MN1214A MN1418VVW MN1219	IC " " " "	
					<b>OTHER</b> CF8701 FR8014	△	CSB500A QRH141J-180H	Ceramic Filter F R	18Ω 1/4W J

## SS-9024A (Power Supply P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
VARIABLE RESISTOR R9012 9028		QVZ3230-053 " -053	VR (B1 Adj.) " (5V Adj.)	5kΩ B " "	D9018 9019 9021 9023 9024 9025 9026 9027 9028 9030 9031 9032 9033		V09G 1SS133 S1WB10 MA4110(M) RGP10J GU-3SY RD6.2E(B) MA4075(M) " " 1SS133 1S1555 RGP10J MA4051(M)	Si. Diode " " Diode Bridge Zener Diode Si. Diode " " Zener Diode " " Si. Diode " " Zener Diode	
RESISTOR R9001 9002 9004 9006 9024 9036		QRG029J-473 ORM055K-R47 QRG029J-122 QRG039J-221 QRG019J-392S ORF108K-100	OM R MP R OM R " " " " UNFR	47kΩ 2W J 0.47Ω 5W K 1.2kΩ 2W J 220Ω 3W " 3.9kΩ 1W " 10Ω 10W K					
CAPACITOR C9003,4 9006,7 9009 9013 9020,1 9024 9029 9032 9035 9047 9030 9051 9052	△	QCZ9011-472 CEX40255-227 AX490405-331 QEHE51EM-476M QET52CR-107 QEHE51EM-476M QCZ9012-472 QET50JR-108 QEHE51AM-107M " -107M QETB1JM-477 QCZ9025-472A QETB1JM-477	C Cap. E Cap. C Cap. E Cap. " " C Cap. E Cap. " " " " " " C Cap. E Cap.	4700pF AC400V M 220μF " " 330pF 2kV M 47μF 25V " 100μF 160V R 47μF 25V M 4700pF AC400V " 1000μF 6.3V R 100μF 10V M " " " " 470μF 63V M 4700pF AC400V Z 470μF 63V M	TRANSISTOR Q9002 9003 9006 9007 9008 9009 9010		2SC1627A 2SA1112(Q) 2SC3026 SF5J42 2SD866B(P,Q) 2SC1815(Y,GR)	Si. Transistor " " Thyristor Si. Transistor " "	
TRANSFORMER T9001 9002 9003	△	CJ39528-00A CE40361-00A CE40400-00D	SW Transf. SW Drive Transf. SW Transf.		COIL L9001 9003		A04376-680A CJ39509-015	Peaking Coil Heater Choke Coil	680μH
DIODE D9001 ~ 4 9005 9007 9008 9009 9010 9013 9014 9016 9017		RM-2C RU1C UF-3V GU-3SY RGP10J 1SS133 1SS83 RD6.2E(B) 1SS81	Si. Diode " " " " " " " " " " " " Zener Diode Si. Diode		IC IC9001 9002		AN5900 "	IC " "	
					OTHER TH9001 F9002 TF9001 9002	△ △ △ △	CE40478-001 QMF51E2-R40S CE40528-135 "	W. Posistor Fuse Thermal Fuse	0.4A

## SS-9023A (AC Terminal P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
CAPACITOR C9001 9002	△ △	QFZ9017-104M QFZ9017-104M	MM Cap. " "	0.1μF AC250V M " " "	OTHER F9001 LF9001	△ △ △	QMF51E2-4R0S C30239-A QMP4058-200R	Fuse Line Filter Power Cord	4.0A

## SS-9022A (Line Filter P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
CAPACITOR C9005	△	QFZ9017-104M	MM Cap.	0.1μF AC250V M	OTHER LF9002	△	CE40819-00A	Line Filter	

## SS-9209A (AV I/O Switch P.B. Ass'y)

SYMBOL NO.	PART NO.	PART NAME	REMARK	SYMBOL NO.	PART NO.	PART NAME	REMARK
<b>RESISTOR</b> R9229 9230	ORG019J-330S " -330S	OM R "	33Ω 1W J " " "	<b>TRANSISTOR</b> Q9201 9202 9203 9231,2 9211,2 9213 9233 ~ 5 9236,7	2SC1815(Y,GR) 2SA1015(Y,GR) 2SC1815(Y,GR) 2SD637(Q,R) 2SC1815(Y,GR) 2SC1213(C) 2SD1330(T) 2SD637(Q,R)	Si. Transistor " " Transistor Si. Transistor " " Transistor	
<b>CAPACITOR</b> C9246 9247 9250	QEN61CM-106Z " -106Z " -106Z	BP E Cap. " "	10μF 16V M " " " " " "	<b>COIL</b> L9201 ~ 8	A76186-2.2	Peaking Coil	2.2μH
<b>DIODE</b> D9201 ~ 2 9204 ~ 6 9208 ~ 9 9232 9234	MA165	Si. Diode		<b>IC</b> IC9201 9202	TC4066BP TC4052BP	IC "	
				<b>OTHER</b> S9202 J9201	A76574 A49647-C	Slide SW. Print Jack	75Ω SW.

## CHASSIS AND CABINET PARTS LIST

VIEW NO.	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
1			CM10041-00W	Front Panel Ass'y	
2			CM20105-A01	Door	Within Front Panel Ass'y
3			CM30201-025	AV Door	"
4			CM41306-002	Spring	"
5			CM20117-A0Q	Window Plate	"
6			See View No. 51		
7			CM30622-002	Select Knob	(x2) Vol. Within Front Panel Ass'y
8			CM40478-002	Rabbit Eye	"
9			CM40497-00A	Color Mark	"
10			CM30227-012	Operation Sheet	"
11			CM40494-002	AV Select Knob	(x2) INPUT A/B Within Connect Panel Ass'y
12			CM40494-005	AV Select Knob	75Ω switch "
13	D5403		GL-9NG4	LED	DISC
14	D5405		GL-9NG4	"	INPUT B
15	D5406		GL-9NG4	"	INPUT A
16			CM40661-00B	Brand Mark Ass'y	
17			A27355-BV0	Cord Clamp	
18	V01	△	510UZB22-AC	Picture Tube	
19	L01	△	CJ39538-00D	Degaussing Coil	(x2)
20	DY01	△	CJ20110-00A	Def. Yoke Ass'y	
21			A75034-B	PC Magnet	
22			CJ30033-00A	Wedge Ass'y	(x3)
23	SP01,02		HSA1018-01E	Speaker	(x2)
24	T01	△	CE30069-00B	Power Transf.	
25			CE40214-00A	W Q Magnet	(x2)
26			A46445	Focus Cover	(x2)
27			CJ26073-00B	H V Transf.	
28			CM30734-A01	Filter Cover	
29			CM10043-007	Rear Cover	
30			CM20007-017	Rating Label	
31			GBSB4016N	Tap Screw	
32			QMP4058-200R	Power Cord	
33			N47971	Cord Clamp	(x9)

## SS-9024A (Power Supply P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>VARIABLE RESISTOR</b>					D9018		V09G	Si. Diode	
R9012 9028		QVZ230-053 " -053	VR (B1 Adj.) " (5V Adj.)	5kΩ " B	9019		1SS133	"	
					9021		S1WB10	Diode Bridge	
					9023		MA4110(M)	Zener Diode	
					9024		RGP10J	Si. Diode	
					9025		GU-3SY	"	
					9026		RD6.2E(B)	Zener Diode	
					9027		MA4075(M)	"	
					9028		1SS133	Si. Diode	
					9030		1S1555	"	
					9031		RGP10J	Zener Diode	
					9032		MA4051(M)	"	
					9033				
<b>RESISTOR</b>					<b>TRANSISTOR</b>				
R9001 9002 9004 9006 9024 9036		ORG029J-473 ORM055K-R47 ORG029J-122 ORG039J-221 ORG019J-392S QRF108K-100	OM R MP R OM R " " UNFR	47kΩ 2W J 0.47Ω 5W K 1.2kΩ 2W J 220Ω 3W " 3.9kΩ 1W " 10Ω 10W K	Q9002		2SC1627A	Si. Transistor	
					9003		2SA1112(Q)	"	
					9006		2SC3026	"	
					9007		SF5J42	Thyristor	
					9008		2SD866B(P,Q)	Si. Transistor	
					9009		2SC1815(Y,GR)	"	
					9010		"		
<b>CAPACITOR</b>					<b>COIL</b>				
C9003,4 9006,7 9009 9013 9020,1 9024 9029 9032 9035 9047 9030 9051 9052	△	QCZ9011-472 CEX40255-227 AX490405-331 QEHE51EM-476M QET52CR-107 QEHE51EM-476M QCZ9012-472 QET50JR-108 QEHE51AM-107M " -107M QETB1JM-477 QCZ9025-472A QETB1JM-477	C Cap. E Cap. C Cap. E Cap. " " C Cap. E Cap. " " " " " " C Cap. E Cap.	4700pF AC400V M 220μF " " 330pF 2kV M 47μF 25V " " 100μF 160V R " 47μF 25V M 4700pF AC400V " 1000μF 6.3V R 100μF 10V M " " " " 470μF 63V M 4700pF AC400V Z 470μF 63V M	L9001 9003		A04376-680A CJ39509-015	Peaking Coil Heater Choke Coil	680μH
<b>TRANSFORMER</b>					<b>IC</b>				
T9001 9002 9003	△ △	CJ39528-00A CE40361-00A CE40400-00D	SW Transf. SW Drive Transf. SW Transf.		IC9001 9002		AN5900 "	IC	
<b>DIODE</b>					<b>OTHER</b>				
D9001 ~ 4 9005 9007 9008 9009 9010 9013 9014 9016 9017		RM-2C RU1C UF-3V GU-3SY RGP10J 1SS133 1SS83 RD6.2E(B) 1SS81	Si. Diode " " " " " " " " " " " " Zener Diode Si. Diode " "		TH9001 F9002 TF9001 9002	△ △ △ △	CE40478-001 QMF51E2-R40S CE40528-135 "	W. Posistor Fuse Thermal Fuse "	0.4A

## SS-9023A (AC Terminal P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>CAPACITOR</b>	△ △	QFZ9017-104M QFZ9017-104M	MM Cap. "	0.1μF AC250V M " " "	<b>OTHER</b>	△ △ △	QMF51E2-4R0S C30239-A QMP4058-200R	Fuse Line Filter Power Cord	4.0A

## SS-9022A (Line Filter P.B. Ass'y)

SYMBOL NO.	△	PART NO.	PART NAME	REMARK	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
<b>CAPACITOR</b>	△	QFZ9017-104M	MM Cap.	0.1μF AC250V M	<b>OTHER</b>	△	CE40819-00A	Line Filter	

## SS-9209A (AV I/O Switch P.B. Ass'y)

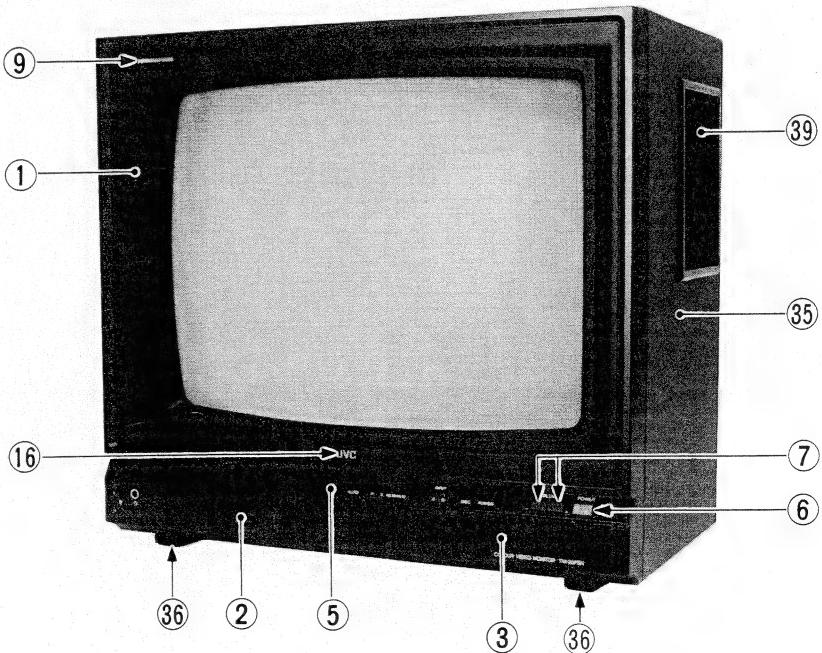
SYMBOL NO.	PART NO.	PART NAME	REMARK	SYMBOL NO.	PART NO.	PART NAME	REMARK
<b>RESISTOR</b> R9229 9230	ORG019J-330S " -330S	OM R "	33Ω 1W J " " "	<b>TRANSISTOR</b> Q9201 9202 9203 9231,2 9211,2 9213 9233 ~ 5 9236,7	2SC1815(Y,GR) 2SA1015(Y,GR) 2SC1815(Y,GR) 2SD637(Q,R) 2SC1815(Y,GR) 2SC1213(C) 2SD1330(T) 2SD637(Q,R)	Si. Transistor " " Transistor Si. Transistor " " Transistor	
<b>CAPACITOR</b> C9246 9247 9250	QEN61CM-106Z " -106Z " -106Z	BP E Cap. "	10μF 16V M " " "	<b>COIL</b> L9201 ~ 8	A76186-2.2	Peaking Coil	2.2μH
<b>DIODE</b> D9201 ~ 2 9204 ~ 6 9208 ~ 9 9232 9234	MA165	Si. Diode		<b>IC</b> IC9201 9202	TC4066BP TC4052BP	IC "	
				<b>OTHER</b> S9202 J9201	A76574 A49647-C	Slide SW. Print Jack	75Ω SW.

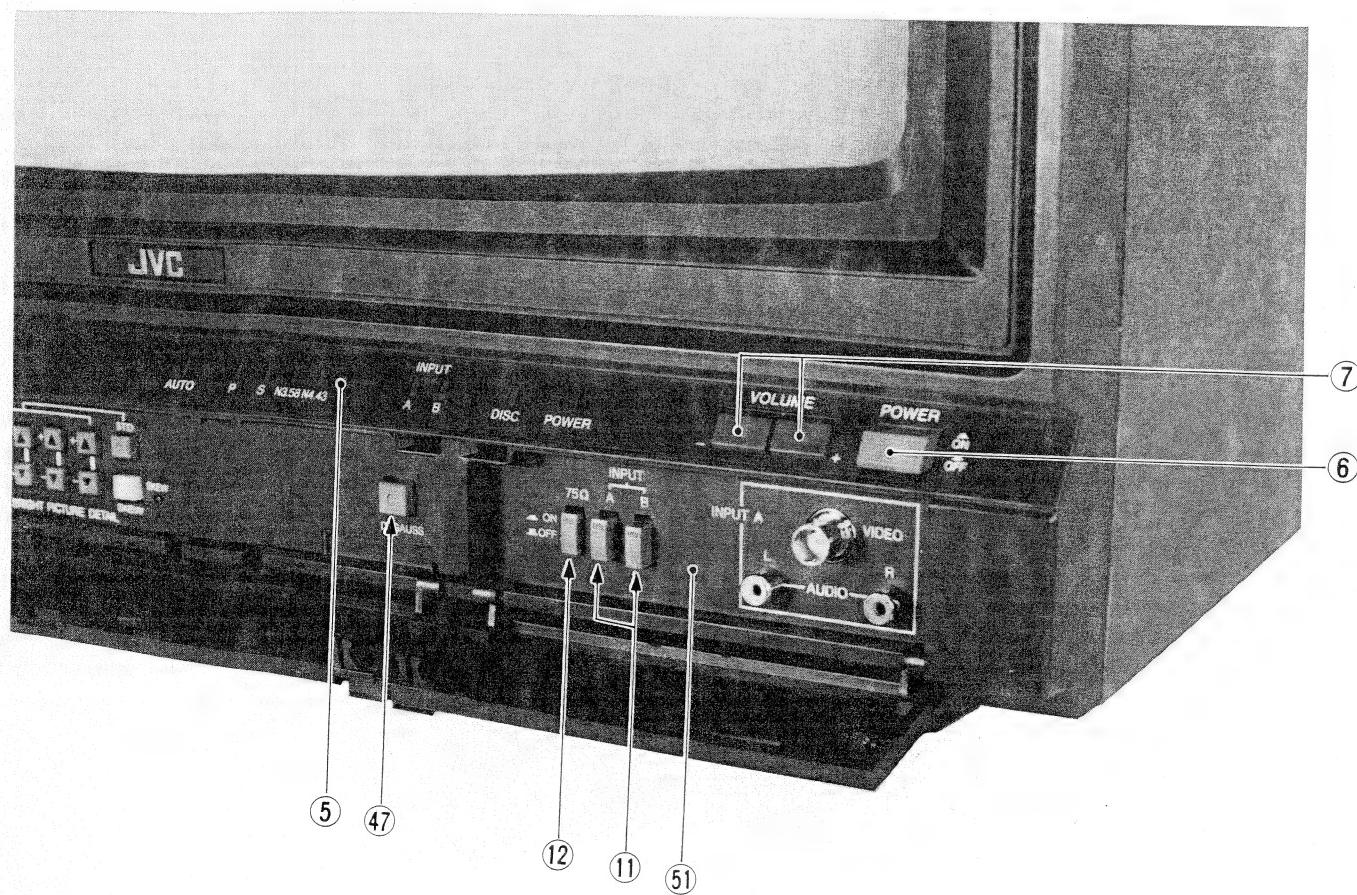
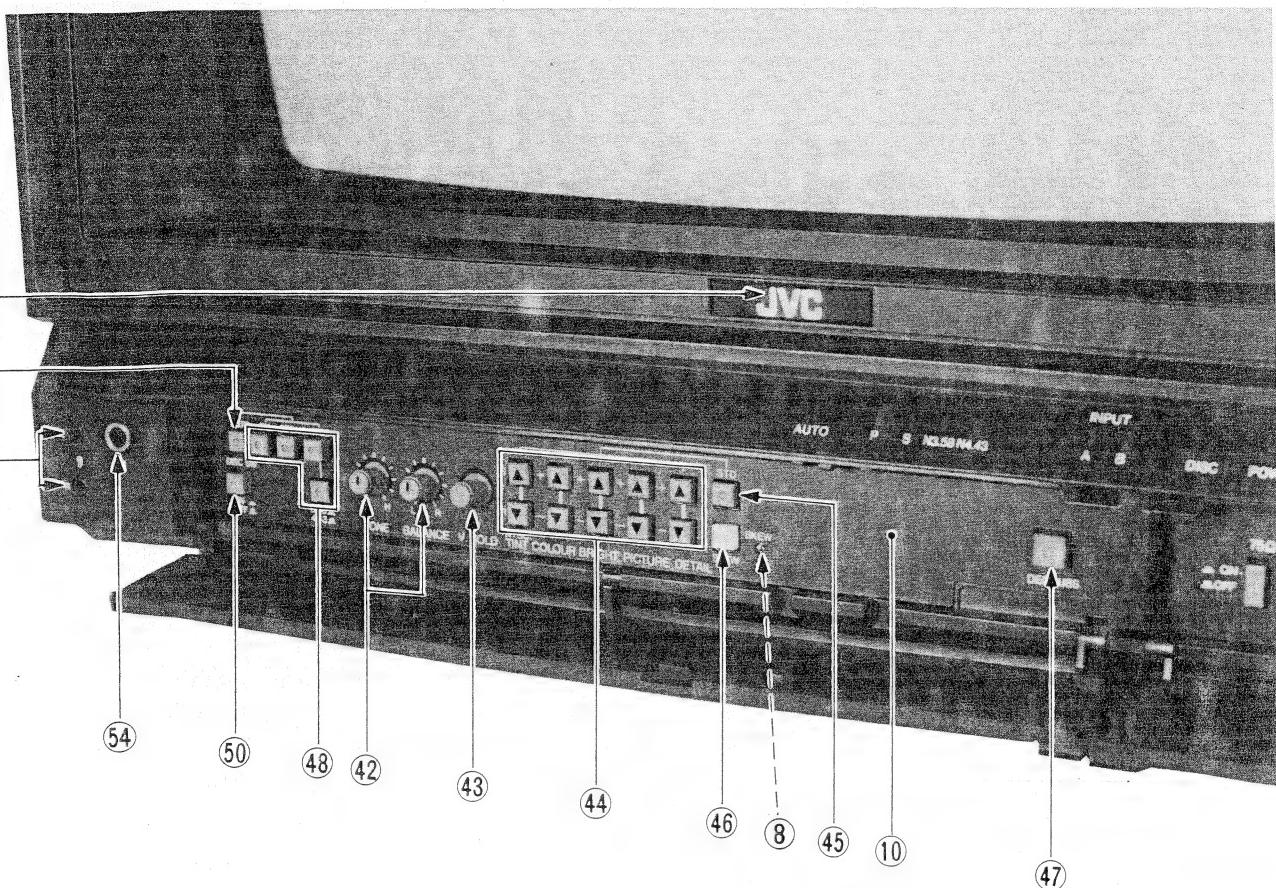
## CHASSIS AND CABINET PARTS LIST

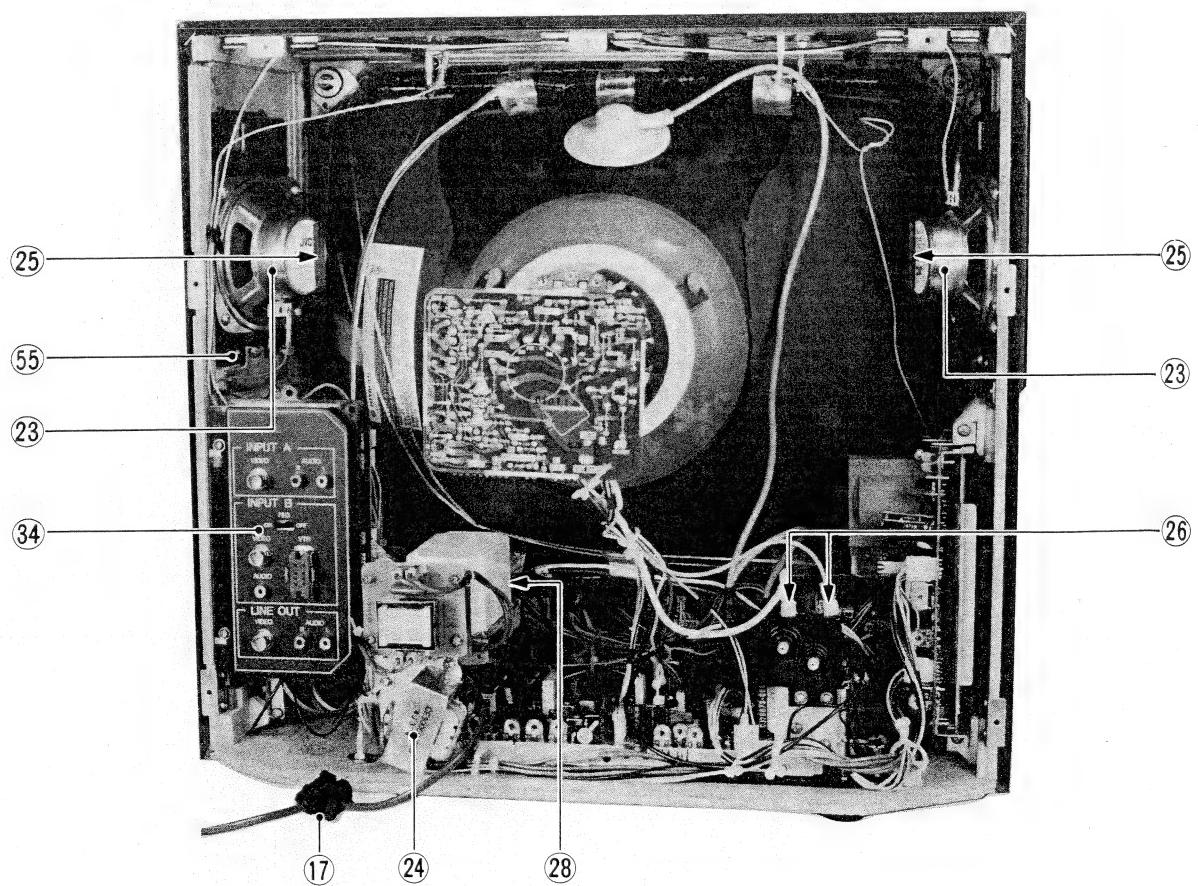
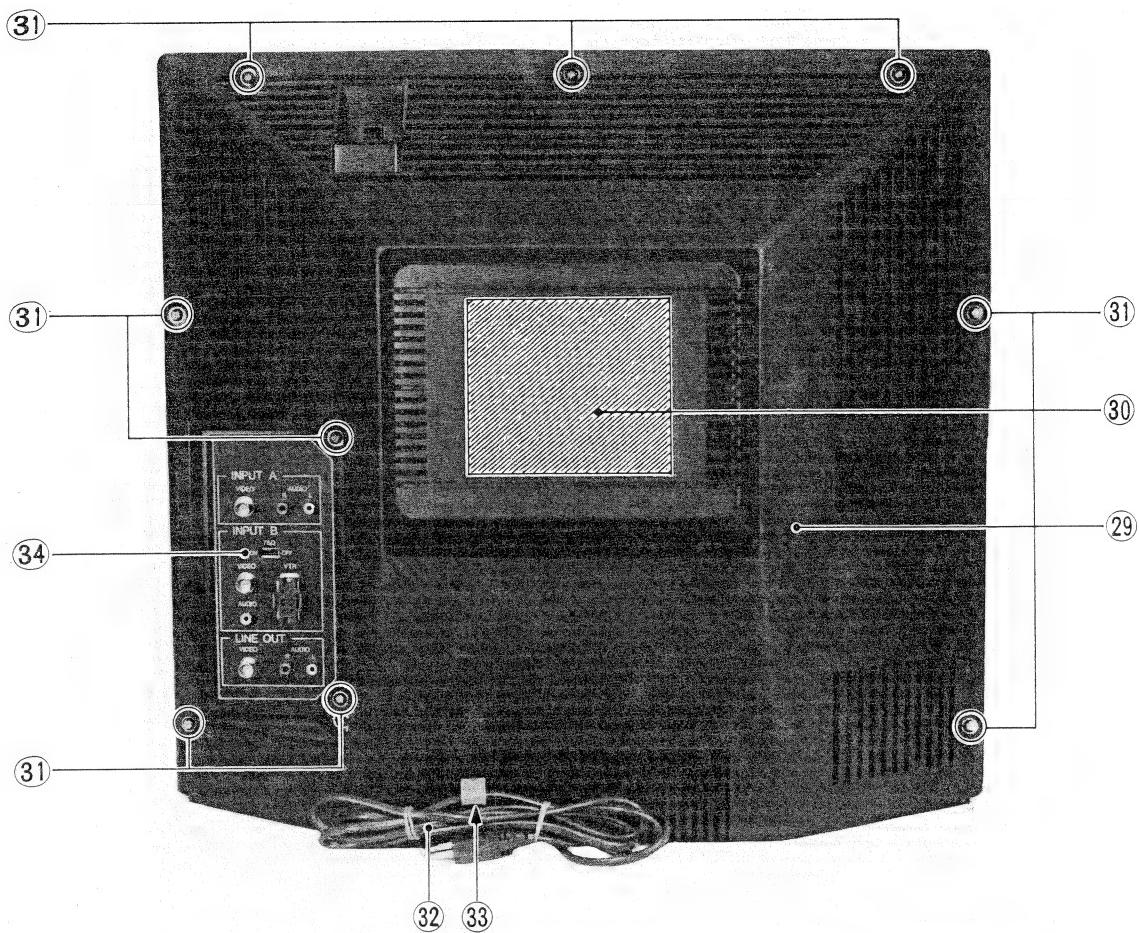
VIEW NO.	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
1			CM10041-00W	Front Panel Ass'y	
2			CM20105-A01	Door	Within Front Panel Ass'y
3			CM30201-025	AV Door	"
4			CM41306-002	Spring	"
5			CM20117-A0Q	Window Plate	"
6			See View No. 51		
7			CM30622-002	Select Knob	(x2) Vol. Within Front Panel Ass'y
8			CM40478-002	Rabbit Eye	"
9			CM40497-00A	Color Mark	"
10			CM30227-012	Operation Sheet	"
11			CM40494-002	AV Select Knob	(x2) INPUT A/B Within Connect Panel Ass'y
12			CM40494-005	AV Select Knob	75Ω switch
13	D5403		GL-9NG4	LED	DISC
14	D5405		GL-9NG4	"	INPUT B
15	D5406		GL-9NG4	"	INPUT A
16			CM40661-00B	Brand Mark Ass'y	
17			A27355-BV0	Cord Clamp	
18	V01	△	510UZB22-AC	Picture Tube	
19	L01	△	CJ39538-00D	Degaussing Coil	(x2)
20	DY01	△	CJ20110-00A	Def. Yoke Ass'y	
21			A75034-B	PC Magnet	
22			CJ30033-00A	Wedge Ass'y	(x3)
23	SP01,02		HSA1018-01E	Speaker	(x2)
24	T01	△	CE30069-00B	Power Transf.	
25			CE40214-00A	W Q Magnet	(x2)
26			A46445	Focus Cover	(x2)
27	T2502	△	CJ26073-00B	H V Transf.	
28			CM30734-A01	Filter Cover	
29			CM10043-007	Rear Cover	
30			CM20007-017	Rating Label	
31			GBSB4016N	Tap Screw	
32			QMP4058-200R	Power Cord	
33		△	N47971	Cord Clamp	(x9)

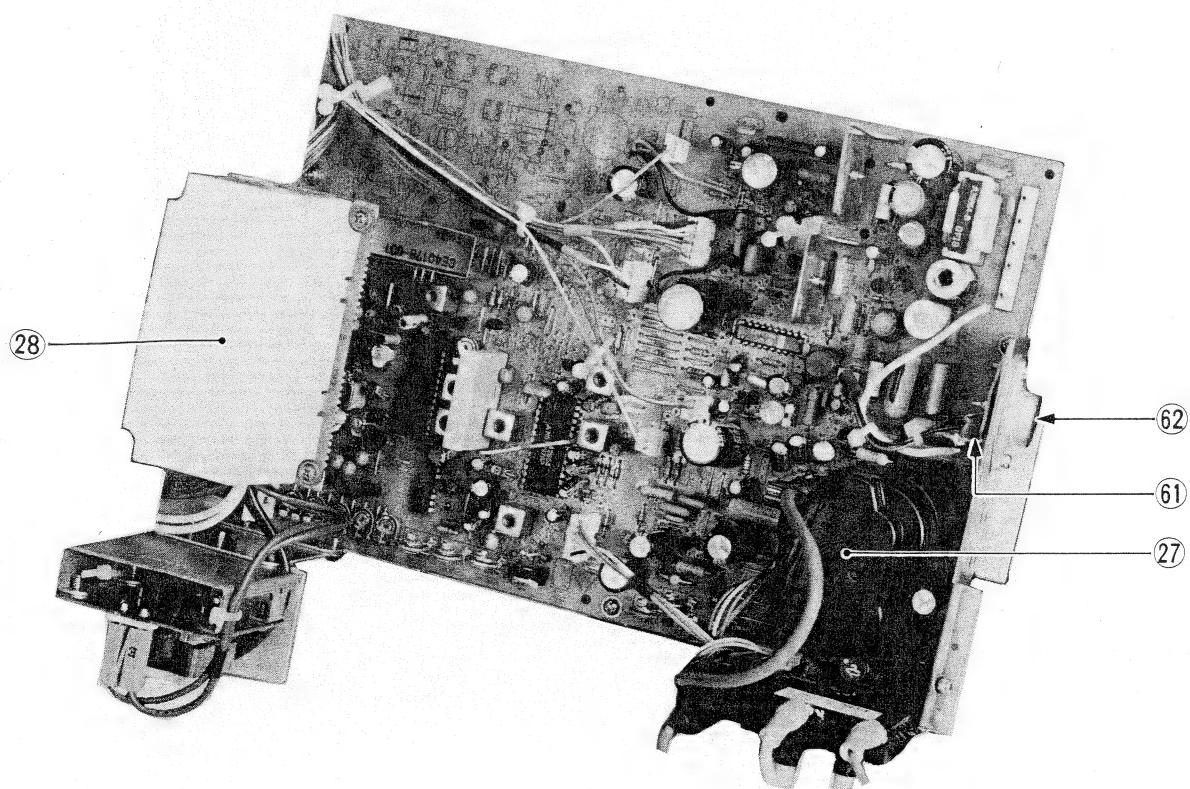
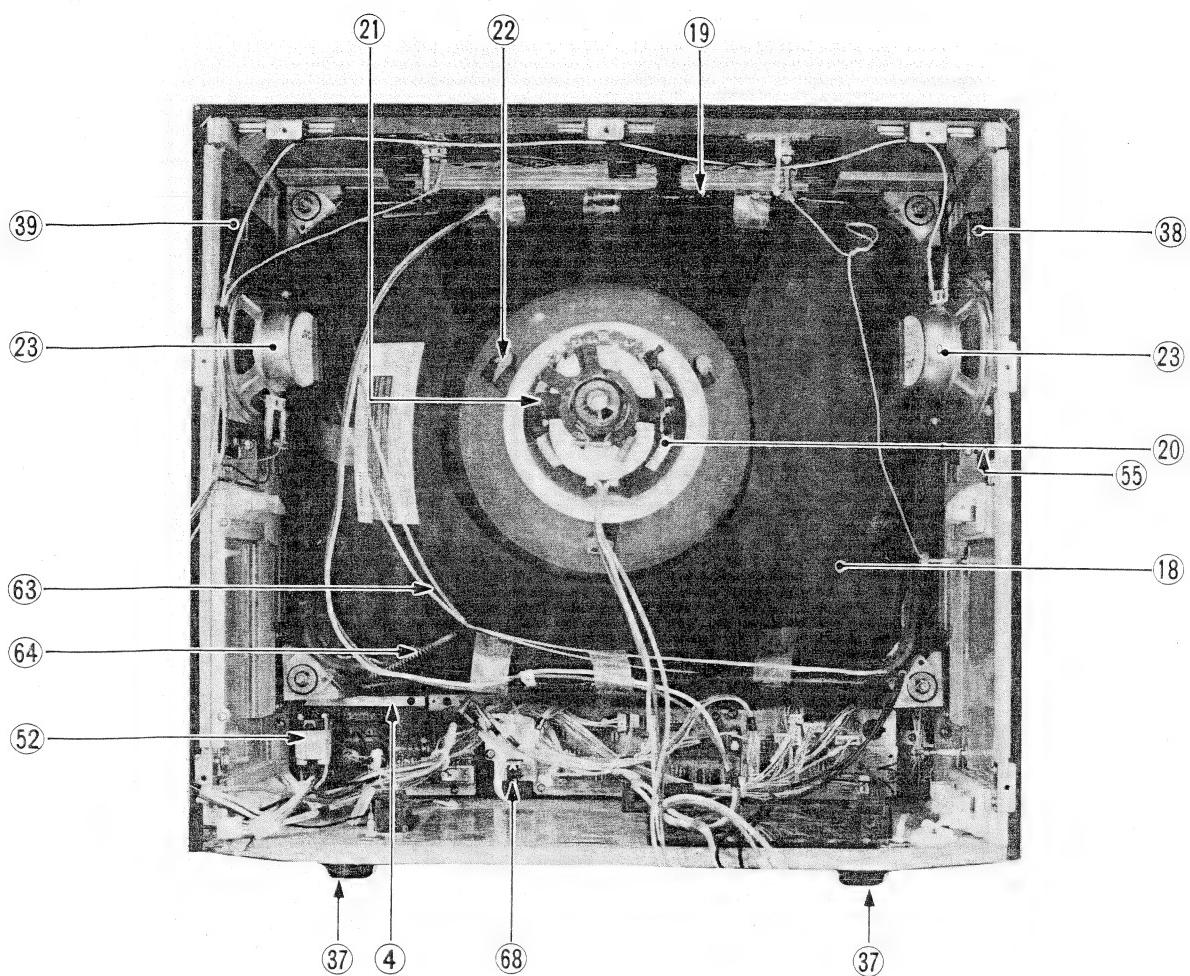
VIEW NO.	SYMBOL NO.	△	PART NO.	PART NAME	REMARK
34			CM20518-00A	Terminal Ass'y	
35			TM-20PSND-CB	Cabinet Ass'y	
36			CN30048-00A	Foot Ass'y	(x2) Within Cabinet Ass'y
37			CN40054-00A	"	(x2) "
38			CM10049-015	SP. Grill (L)	
39			CM10049-016	SP. Grill (R)	
40	J01,02		CEX40050-001	Earphone Jack	(x2)
41	D4103		LN31GCP-UHL	LED	SKEW
42			CM40496-001	VR Knob	(x2) TONE, BALANCE
43			CM40496-002	"	V. HOLD
44			CM40474-A01	Knob	(x10)
45			CM40474-B02	"	STD
46			CM40474-A06	"	SKEW
47			<b>CM40498-002</b>	"	Degauss SW.
48			CM41420-001	Button	(x4) SYSTEM Switch
49			CM41420-002	"	AUTO
50			CM41420-003	"	DISC
51			CM31180-00A	Connect Panel Ass'y	
6			CM31181-001	Power Knob	Within Connect Panel Ass'y
52	S01	△	<b>CEX40097-003</b>	Power Switch	"
53	D5401		LN842RP	LED	MAIN POWER
54	J03		<b>AX49606</b>	Jack	HEADPHONE
55			CM40575-003	Spring	(x2) SP. Grill
56	D5411		GL-9PR4	LED	AUTO Indicator
57	D5412		GL-9NG4	"	PAL "
58	D5413		GL-9NG4	"	SECAM "
59	D5414		GL-9NG4	"	NTSC 3.58 "
60	D5415		GL-9NG4	"	NTSC 4.43 "
61	C01		QCZ0101-005	C Cap.	150pF, AC1.5kV J
62	Q503	△	2SD871	Transistor	H. OUT
63			CH30158-00A	CRT Earth Wire	
64			A48457	Spring	(x2)
65	S4601		CEX40086-007	Push Switch	75Ω Switch
66	S4603		A76103-C	Key Board SW.	Vol. Up-Down
67	S4604		A76103-C	"	INPUT A/B
68	S02		CEX40199-003	Degauss Switch	

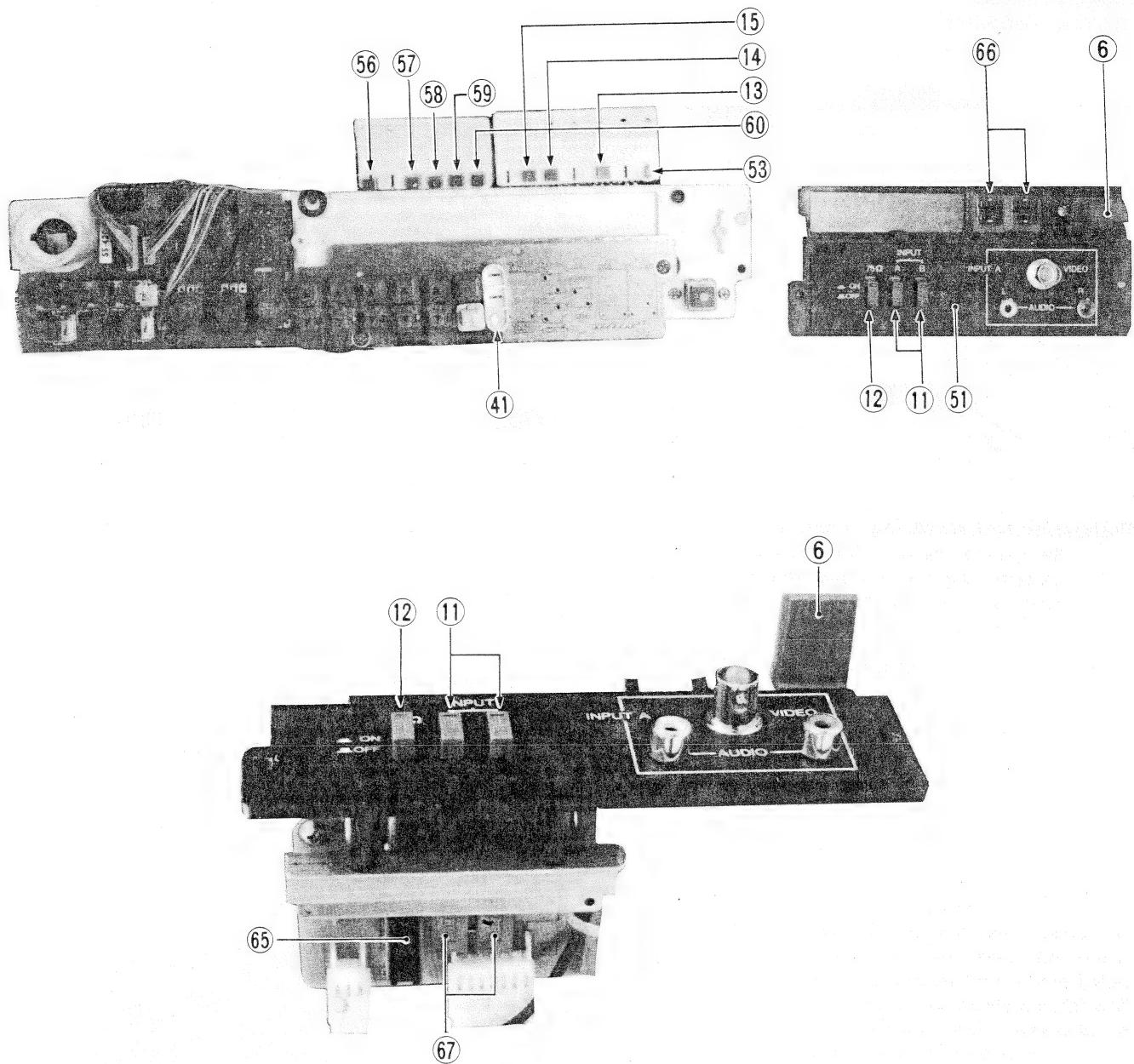
## [EXPLODED VIEW]





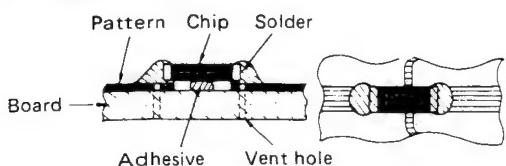






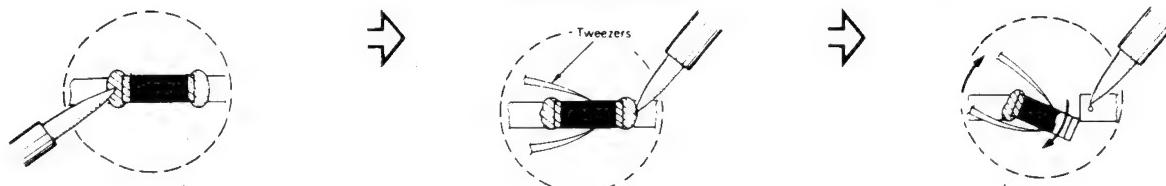
## 7. REPLACEMENT OF THE CHIP

### 1 When mounted [Resistor · Capacitor]



### 2 Removal of the chip

- (1) Remove either of the soldered contacts.
- (2) Hold the chip with tweezers and remove the other contact.
- (3) Work the chip free from the adhesive with tweezers.

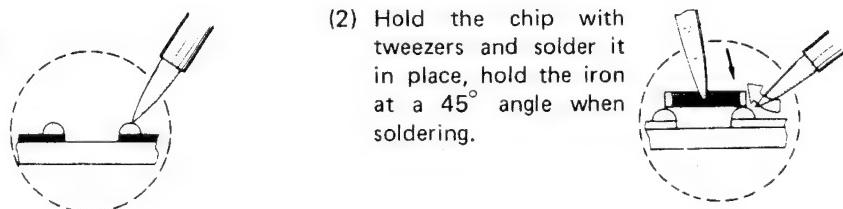


### 3 Preheating and soldering of chip pieces

Be sure to preheat chip pieces (except the transistor) especially the capacitor before soldering with hot air, about 150°C (hair dryer or such can be used) for about 2 minutes. Then, immediately solder with an iron of about 30W.

### 4 Replacing the chip pieces

- (1) Apply the solder to the board first.
- (2) Hold the chip with tweezers and solder it in place, hold the iron at a 45° angle when soldering.

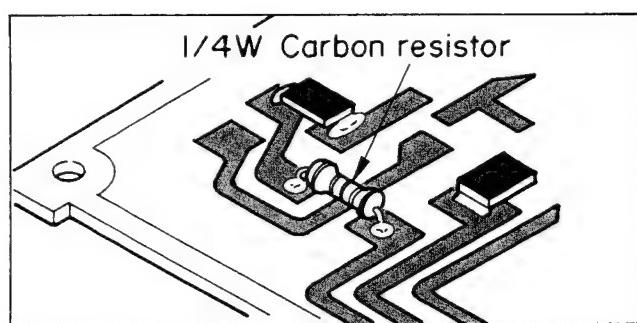


- Discrete parts can be substitutionally mounted as shown in the figure on the right.

Mounting is also possible by passing the wires from the board front side (parts side) through the chip soldering hole (vent hole of registration part).

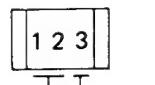
Substitute parts are as follows.

- Chip Metal Glaze Resistor  
→ Carbon Resistor 1/4W ±5%
- Chip Ceramic Capacitor  
→ Ceramic Capacitor 50V ±5%



### ■ Decoding of chip parts constant terms

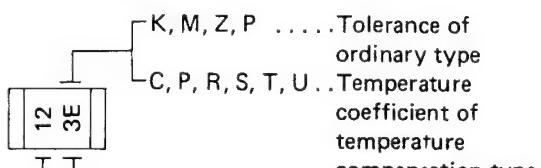
#### < Chip Metal Glaze Resistor >



Constant Multiplier term

$$12 \times 10^3 = 12000\Omega \\ = 12k\Omega$$

#### < Chip Ceramic Capacitor >



Constant Multiplier term

$$12 \times 10^3 = 12000\text{pF} \\ = 0.012\mu\text{F}$$

## 8. HOW TO REMOVE FOR SERVICE

### REMOVING REAR CABINET

1. Unplug the power supply cord and unscrew the nine screws (A) shown in Fig. 8-1.

### REMOVING CHASSIS

1. Remove the two screws marked (A) in Fig. 8-2.
2. Then remove the anode wire and other wires (if necessary).
3. Disconnect the connectors from the power P.B. Ass'y.
4. Withdraw, the chassis backward along the rail.
- \* When conducting a check with power supplied, be sure to confirm that the CRT earth wire is connected to the CRT socket board and the chassis.

### REMOVING INPUT TERMINAL ASS'Y

1. Loosen the two screws (B) shown in Fig. 8-2 and remove the input terminal ass'y.

### REMOVING SENSOR AND AUDIO OUT BOARD

1. Remove the input terminal ass'y. (Refer to REMOVING TERMINAL ASS'Y.)
2. Remove the two screws (A) shown in Fig. 8-3.
3. Withdraw the SENSOR AND AUDIO OUT BOARD backward along the rail.
- \* Remove the connectors (if necessary).

### REMOVING POWER BOARD

1. Remove the two screws (C) shown in Fig. 8-2.
2. Withdraw the POWER BOARD backward along the rail.
- \* Remove the connectors (if necessary).

### REMOVING FRONT CONTROL BOARD AND CONNECT PANEL ASS'Y

1. Unscrew the five screws (A) shown in Fig. 8-4 after removing the chassis and input terminal ass'y.
2. Then take out the front control board and connect panel ass'y from the front panel.
- \* Remove the connects (if necessary).

### WIRE CLAMPING AND TYING BAND

1. Be sure to clamp the wire.
2. Never remove the tying band used for wire clamping. Should it be removed, be sure to reclamp the wire in its original position.  
(Be sure to use insulating material.)

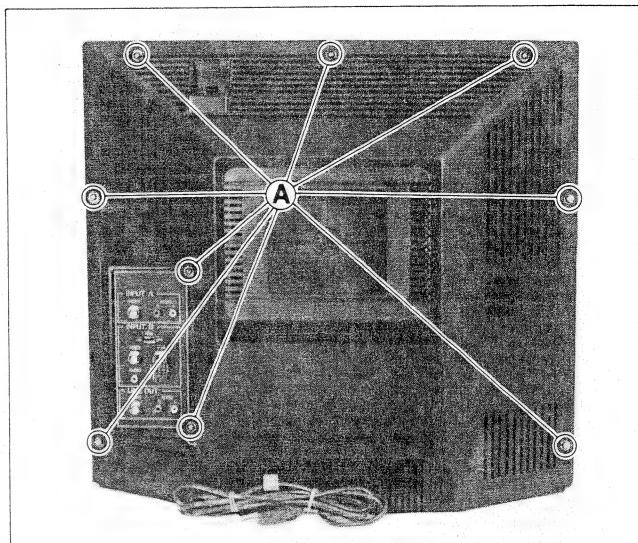


Fig. 8-1

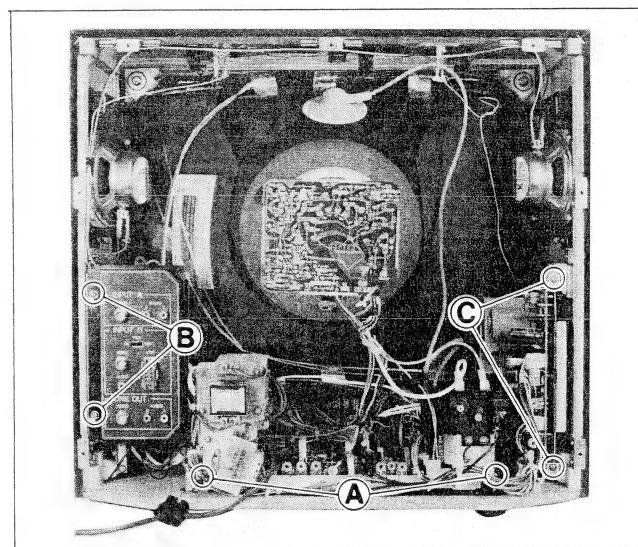


Fig. 8-2

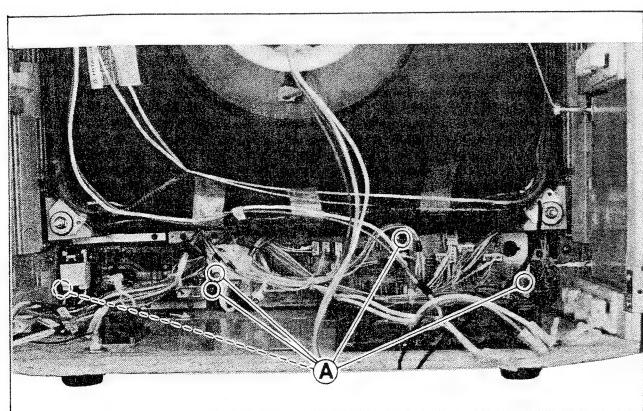


Fig. 8-4

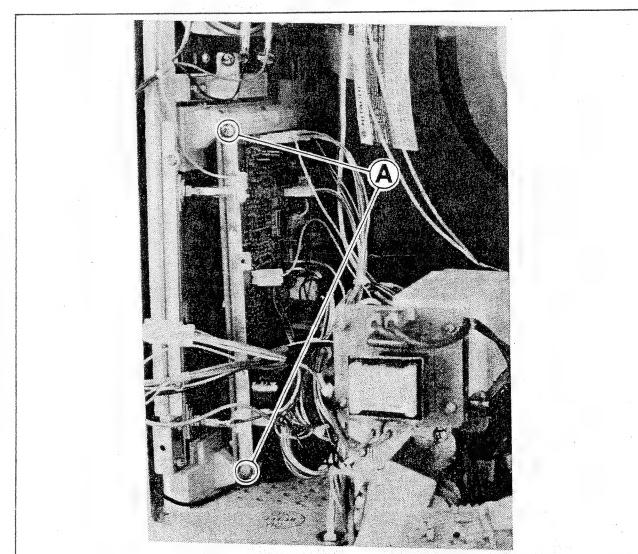
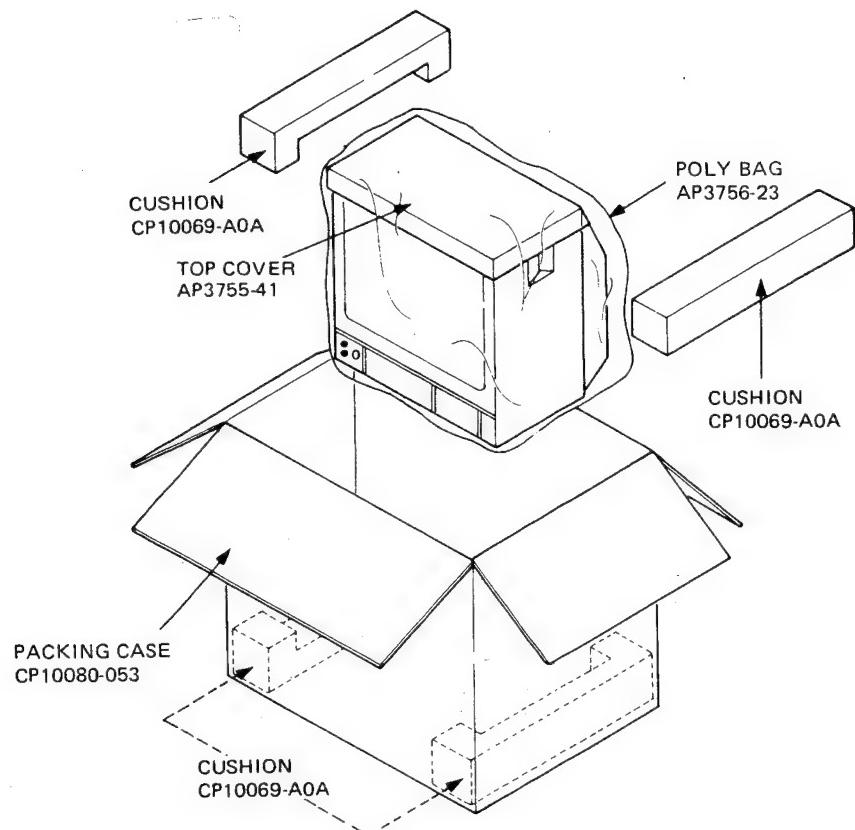


Fig. 8-3

## 3. PACKING DIAGRAM



### ATTACHED MATTERS

Inst. Book .....	TM20PSN(D)-IBA
Reflector (R) .....	CM20120-016
" (L) .....	CM20120-015
Safety Tips .....	BT-20033
X-RAY Card .....	CE30099-001
FTZ Information .....	BT-20054-010

# JVC

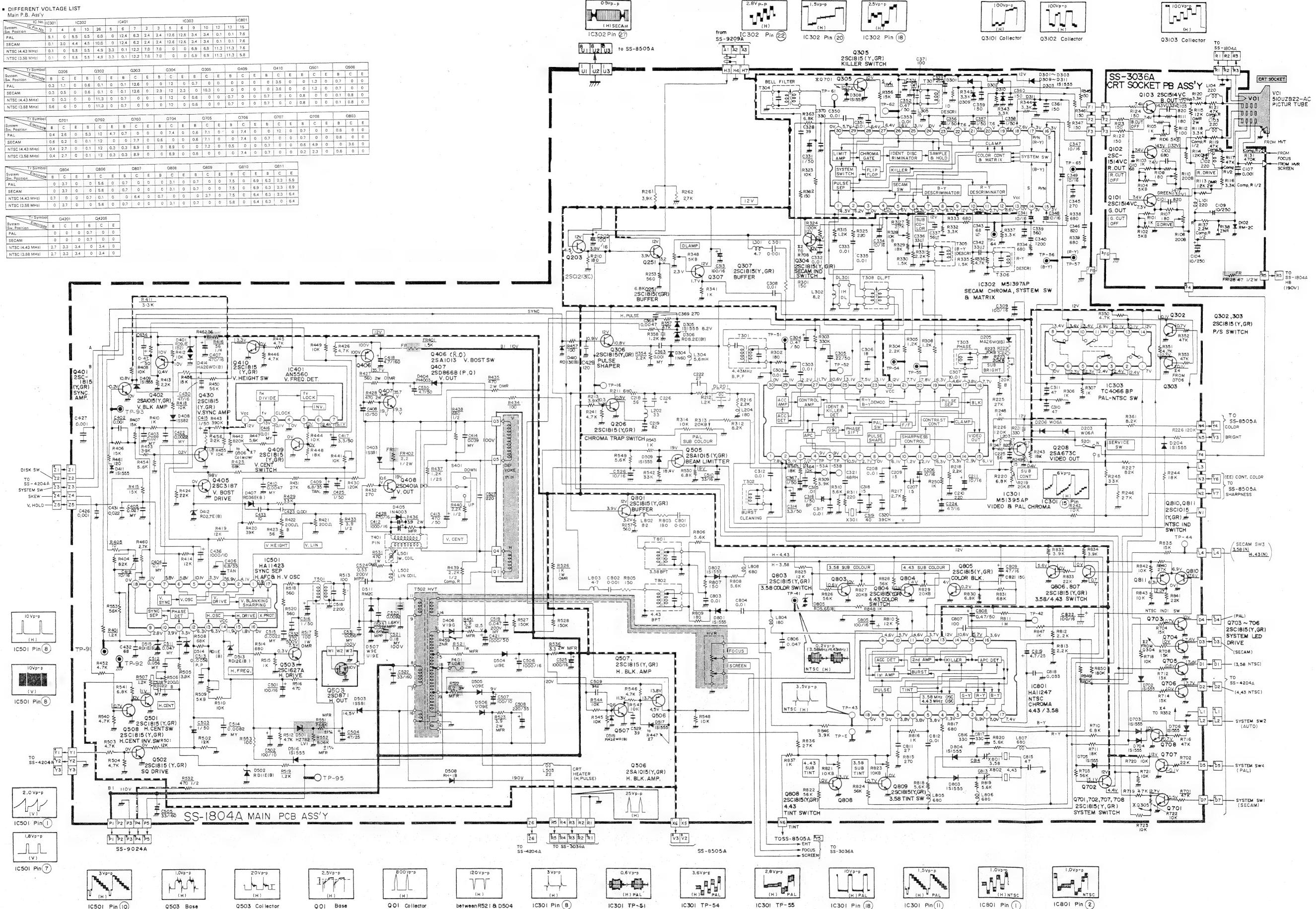
VICTOR COMPANY OF JAPAN, LIMITED  
TELEVISION RECEIVER DIVISION 1106 Iwai-city, Ibaraki-prefecture, 306-06, Japan



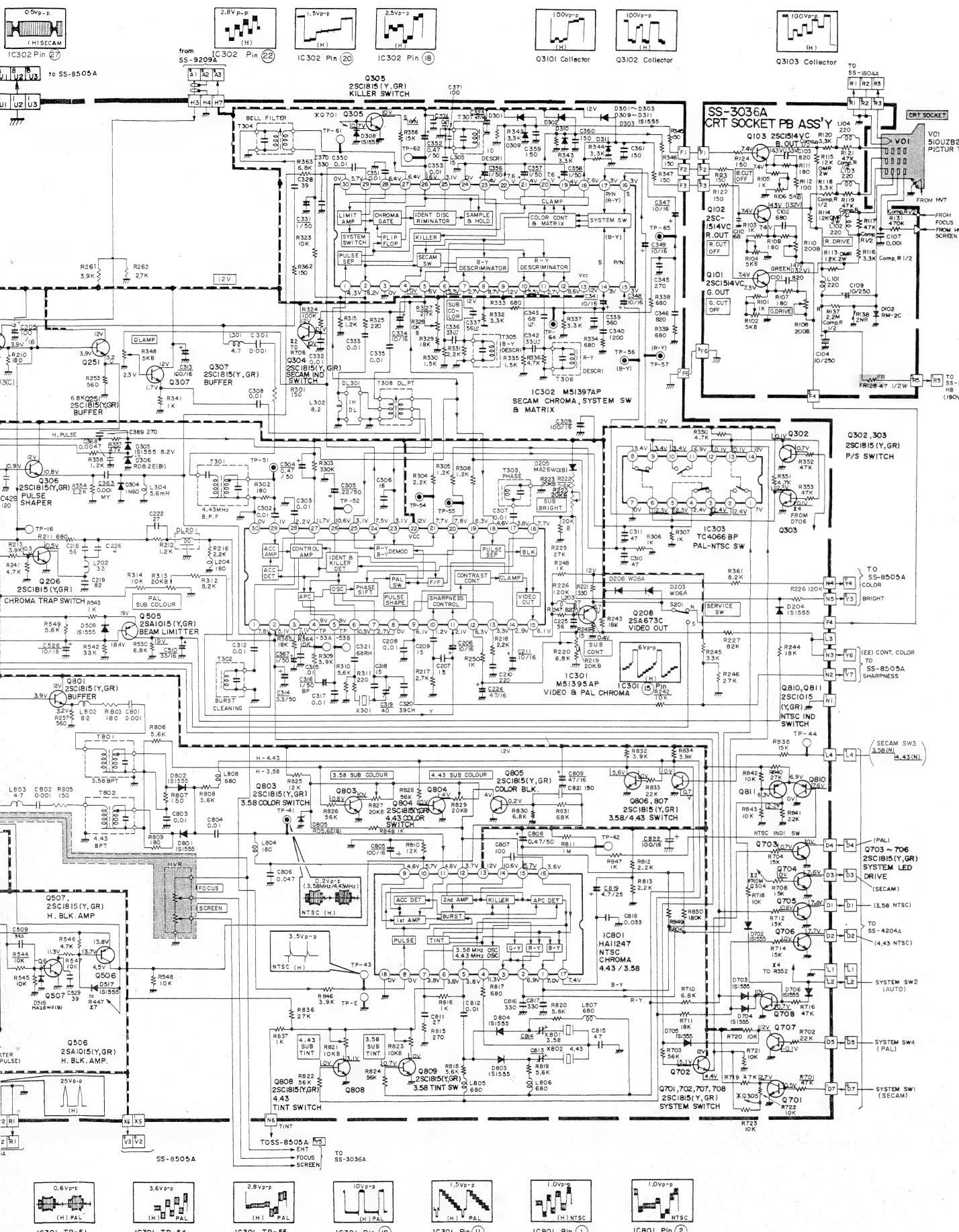
Printed in Japan  
8412 Nissho

## **MAIN SCHEMATIC DIAGRAM**

TM-20PSN (D) TM-20PSN (



6



-JVC TM-20PSN (D) SCHEMATIC DIAGRAM

■ NOTICE

- Voltage and waveform measurements were made using a multimeter and an oscilloscope with the system switch each set to [PAL], [SECAM], and [NTSC (3.58 MHz, 4.43 MHz)] and display a respective color bar signal with sufficient sensitivity.
  - Voltage measurements were made with the SKEW & DISC switch in the OFF position and the other VRs set to the pre-shipping condition.
  - Voltage shown in the schematic diagram are the same for [PAL], [SECAM] and [NTSC (3.58 MHz, 4.43 MHz)]. Voltage which are specially marked (example: [3.5V]) apply for the (PAL) mode. As these values may change at a different position of the system switch, please refer to the different voltage list on SCHEMATIC DIAGRAM.  
The figures of the signal circuits may be more or less different after adjustments, so use the figures simply for reference.

Multimeter used :  
 DC20kΩ/V  
 Given figures are all DC voltages.

Sweep speed of oscilloscope  
 H →  $20\mu\text{s}/\text{div}$ . V →  $5\text{mS}/\text{div}$ .  
 Others → sweep speed specified

\* Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.

## ■ SYMBOL NO. DISPLAY METHOD OF COMPONENTS

- Inside PC board (example)
 

SS-9016A:	R1901 → R01
SS-1804A:	R1806 → R806

## ■ CIRCUIT DIAGRAM DISPLAY SYMBOLS

1. Resistor
    - Resistance value
      - When no unit is provided: [Ω]
      - K: [ $k\Omega$ ]
      - M: [ $M\Omega$ ]
    - Rated permissible power capacity
      - When no display is made: 1/4W (main PB)  
1/6W (other PB)
    - Others : Display are provided
    - Resistor type
 

No type display	:	Carbon resistor
OMR	:	Oxidized metal film resistor
UNF	:	Unflammable resistor
MFR	:	Metal film resistor
FR	:	Fusible resistor

\* Composition resistor 1/2 [W] is displayed as "1/2S" or "comp."
  2. Capacitor
    - Capacity
 

Over 1 [PF]	Below 1 [ $\mu F$ ]
-------------	---------------------
    - Withstand voltage
      - No display : DC 50 [V]
      - Others : DC withstand voltage [V]
      - AC display : AC withstand voltage [V]
    - Display of electrolytic capacitor is as follows.  
(Example)  
47/50 → Capacity [ $\mu F$ ] /withstand voltage [V]
    - Capacitor type
 

No type display	:	Ceramic capacitor
MY	:	Mylar capacitor
MM	:	Metal Mylar capacitor
PP	:	Polypropylene capacitor
MPP	:	Metallic polypropylene
NP	:	Nonpolar electrolytic capacitor
BP	:	Bipolar electrolytic capacitor
TAN.	:	Tantalum capacitor
  3. Coil
    - When no unit is displayed: [ $\mu H$ ]

#### 4. Power supp

 : B1 Voltage (110V)       : 5V  
 : B2 Voltage (12V)       : 20V  
 \* Respective voltage values are indicated.

- and  
SC  
pre-  
L],  
for  
at

5. Test point & GND  
 : Test point  
 : Primary-side GND, : Secondary-side GND

6. Connecting method  
 : Connector  
 : Wrapping or soldering  
 : Receptacle

## ■ CHIP PARTS (resistor & capacitor)

ent Chip parts are used for SS-1804A board.

Discriminating method between chip parts and conventional discrete parts is as follows (only for SS-1804A board):

- Conventional discrete parts: Symbol numbers are underlined.  
(Example)      R151      C151
  - Chip parts: Symbol numbers are not underlined.  
(Example)      R262      C262

## ■ DECONDING CHIP PARTS CONSTANT TERMS

**CHIP METAL GLAZE RESISTOR**

$$1 \times 10^3 = 1000 [\Omega] = 1 [k\Omega] \text{ (Resistance)}$$

term

#### 〈CHIP CERAMIC CAPACITOR〉

K, M, Z . . . . . Tolerance of ordinary type  
 C, P, R  
 S, T, U . . . . . Temperature coefficient of  
                   temperature compensation type

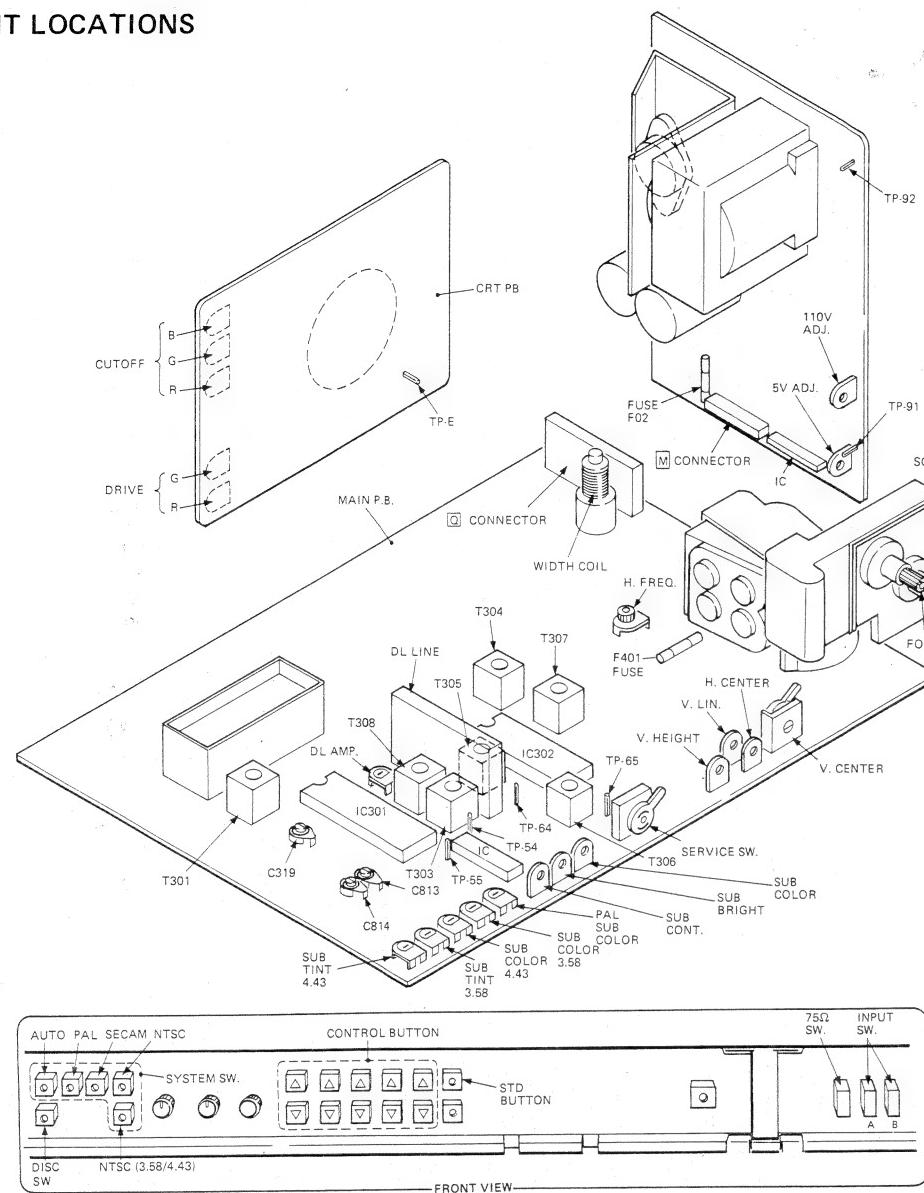
### Constant Multi-term

- $12 \times 10^3 = 12000$  [pF] = 0.012 [ $\mu$ F] (Capacitance)

## ■ SAFETY

  - FR ( <sup>FR</sup>) denotes a fusible resistor which operates as a fuse. When replacing fusible resistors parts indicated with black shading () in the circuit diagrams, be sure to ensure safety by using designated parts.
  - As to other parts too, use designated parts to maintain safety.

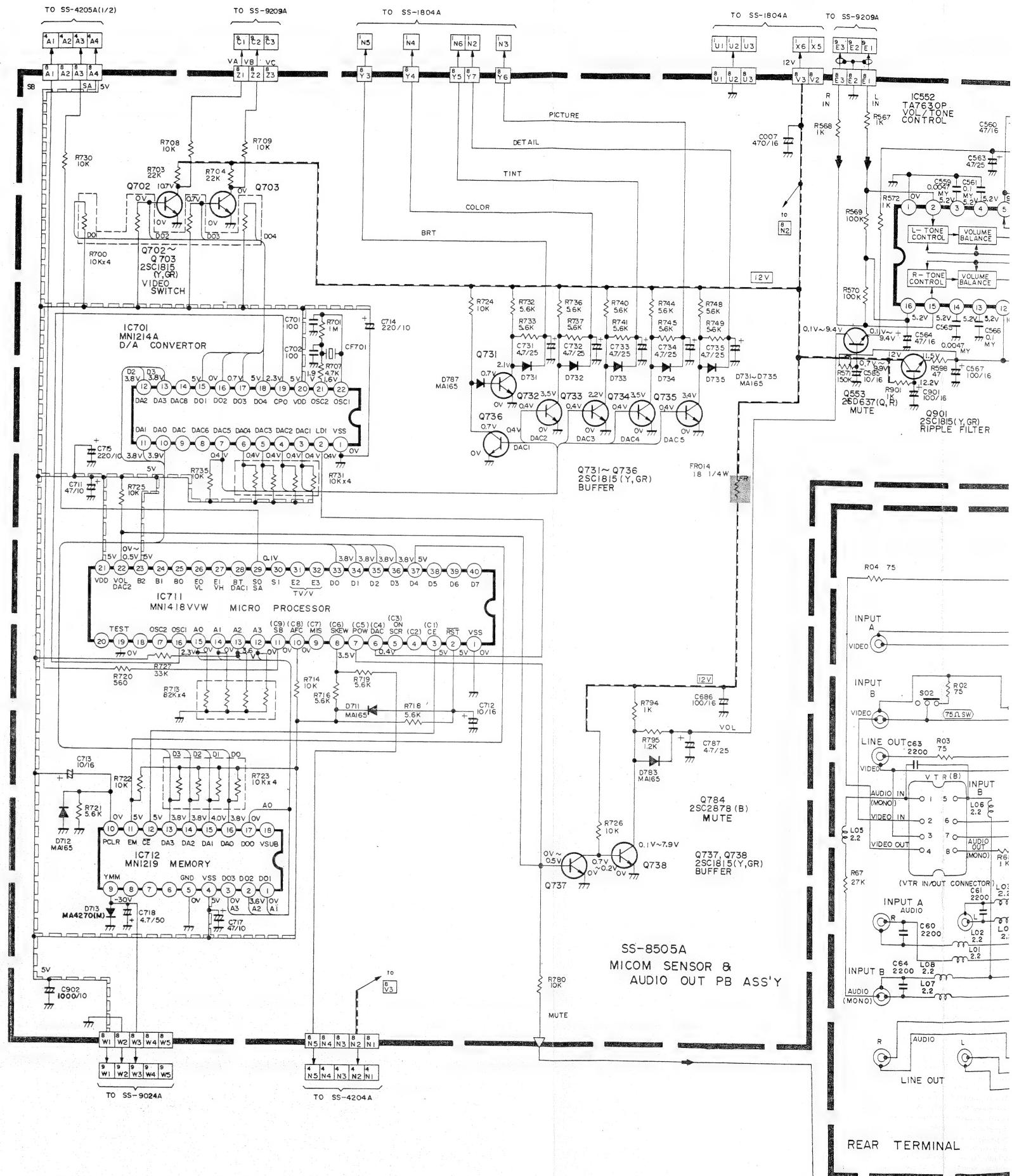
## ■ ALIGNMENT LOCATIONS



## ■ PARTS LIST (Shaded parts in the Schematic Diagram)

Symbol No.	Part No.	Part Name	Symbol No.	Part No.	Part Name
SS-1804A (MAIN PB ASS'Y)			SS-9023A (AC TERM. P.B. ASS'Y)		
C1520	QFZ0081-9201S	MPP Capacitor	C9001	QFZ9017-104M	MM Capacitor
C1521	QFM72AK-184M	M Capacitor	C9002	QFZ9017-104M	MM Capacitor
R1416	QRD149J-560S	CR	F9001	QMF51E2-4ROS	Fuse
R1462	" -560S	CR	LF9001	C30239-A	Line Filter
R1522	QRX039J-8R2	MF R			
R1551	QRV141F-7681	MF R			
R1552	QRV141F-8061	MF R			
D1501	H7ZB2LV1	Zener Diode			
F1401	QMF51E2-1ROS	Fuse			
FR1401	QRH127J-152M	FR			
FR1402	QRH127J-2R2M	FR			
SS-3036A (CRT SOCKET P.B. ASS'Y)			SS-9022A (LINE FILTER P.B. ASS'Y)		
FR3128	QRH127J-470M	FR	C9005	QFZ9017-104M	MM Capacitor
	A75522-F	CRT Socket	LF9002	CE40819-00A	Line Filter
SS-8505A (MICON/AUDIO OUT P.B. ASS'Y)			OUTSIDE OF THE P.B. ASS'Y		
FR8014	QRH141J-180H	FR	V01	510UZB22-AC	Picture Tube
			L01	CJ39538-00D	Deg. Coil
			DY01	CJ20110-00A	Def. Yoke Assembly
			T01	CE30069-00B	Power Transformer
			T1502	CJ26073-00B	H V Transformer
				QMP4058-200R	Power Cord
			S01	CEX40097-003	Power Switch
				2SD871	Transistor
SS-9024A (POWER SUPPLY P.B. ASS'Y)					
T9001	CJ39528-00A	SW Transformer			
T9002	CE40361-00A	SW Drive Transformer			
C9029	QCZ9012-472	C Capacitor			
TH9001	CE40478-001	W. Posistor			
F9002	QMF51E2-R40S	Fuse			
TF9001,2	CE40528-135	Thermal Fuse			

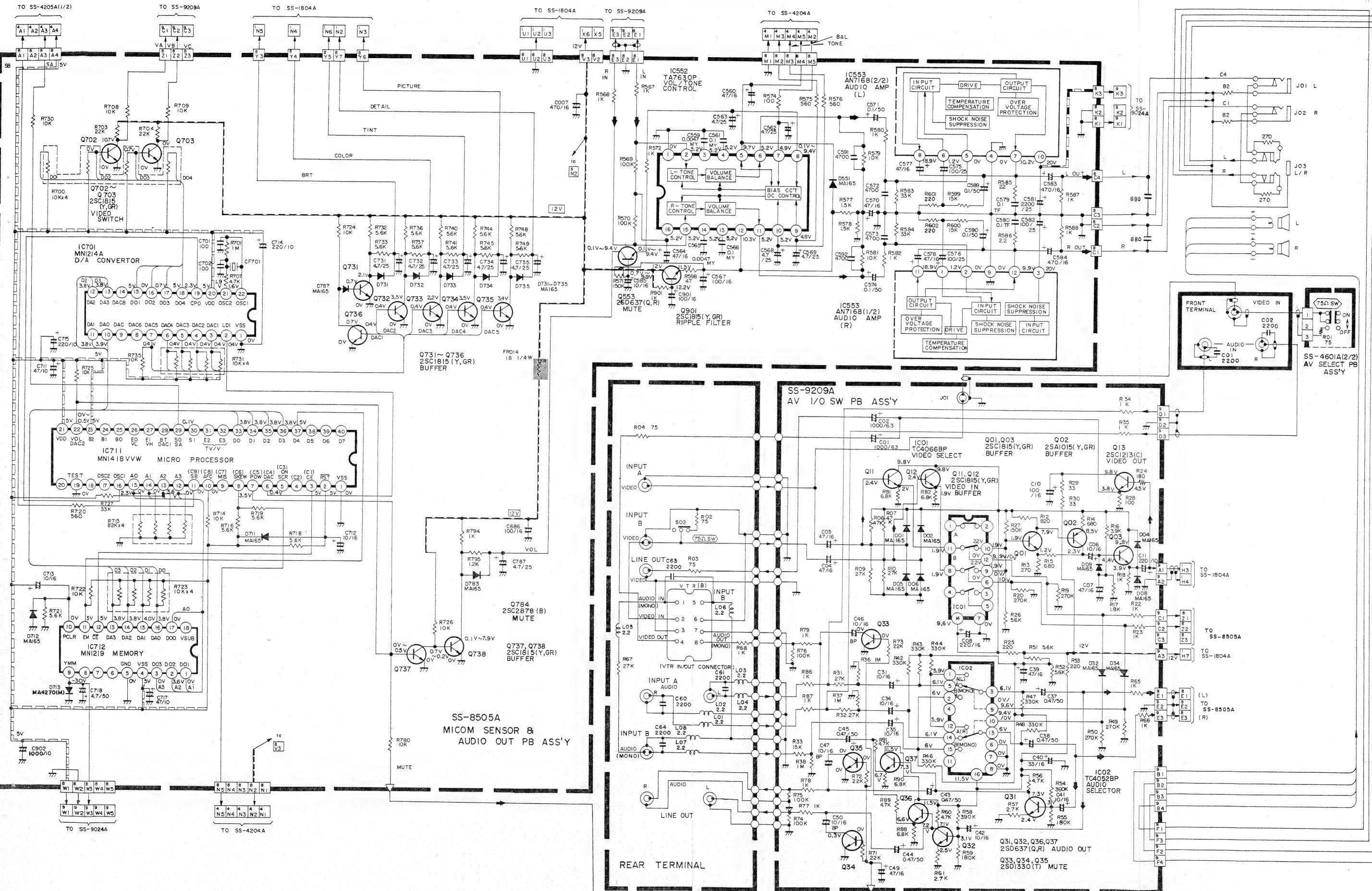
MICON SENCER AUDIO OUT & AV I/O SW.  
SCHEMATIC DIAGRAM



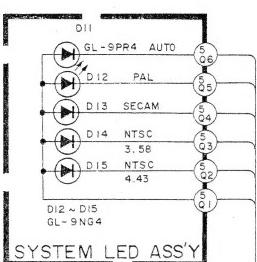
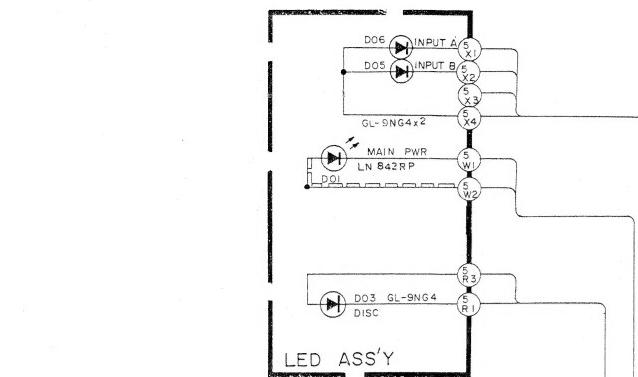
## MICON SENCER AUDIO OUT & AV I/O SW SCHEMATIC DIAGRAM

TM-20PSN (1)

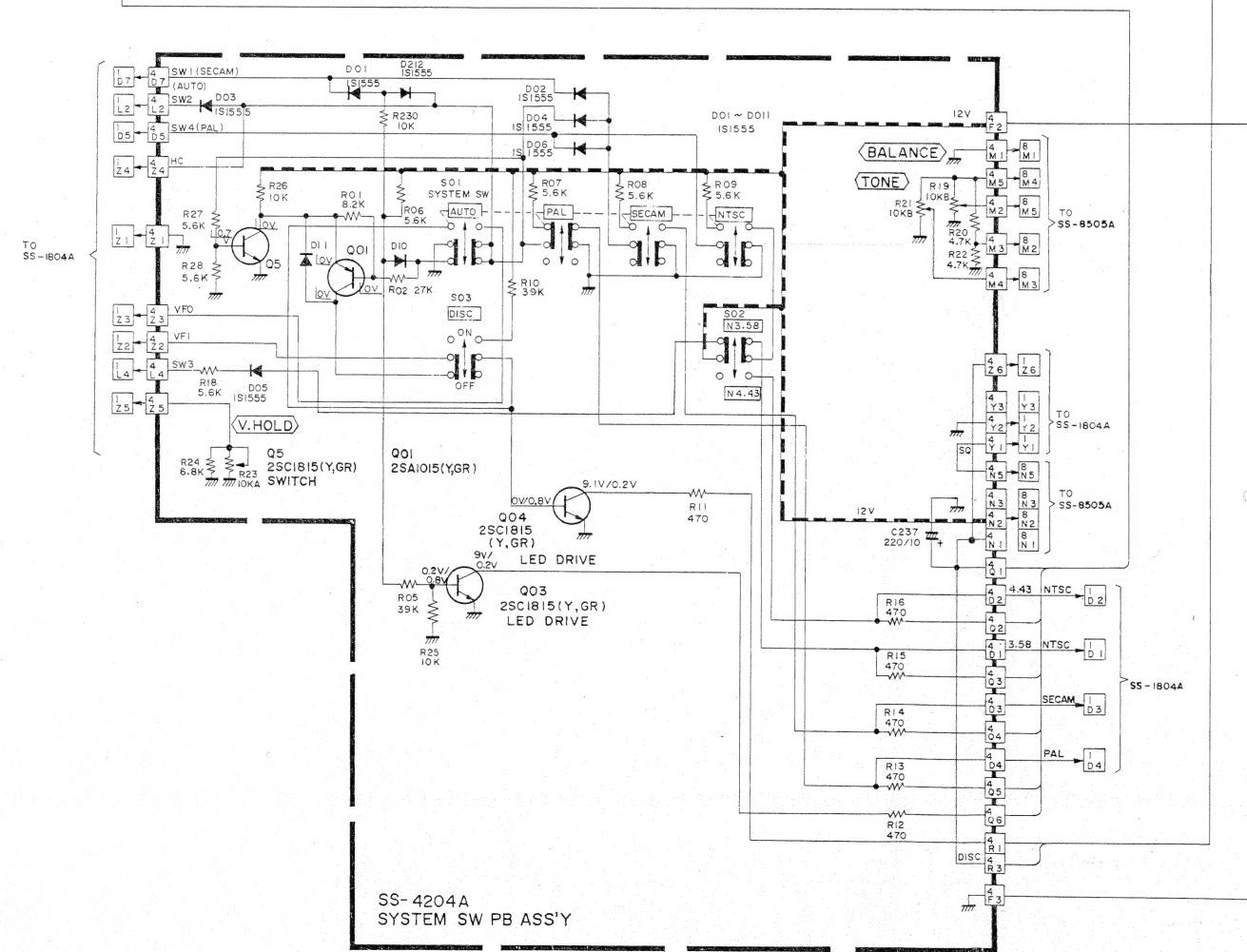
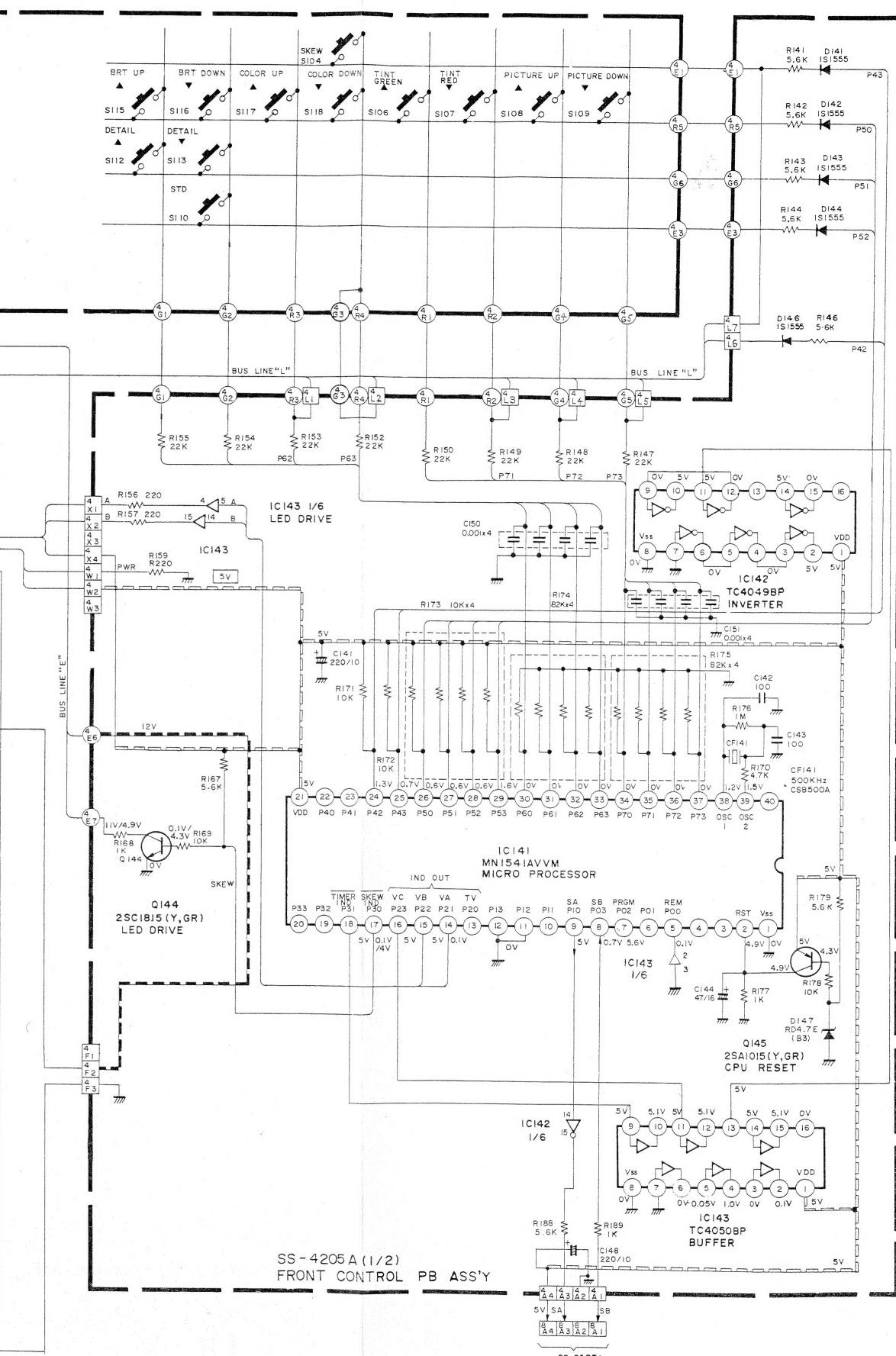
TM-20PSN (E)

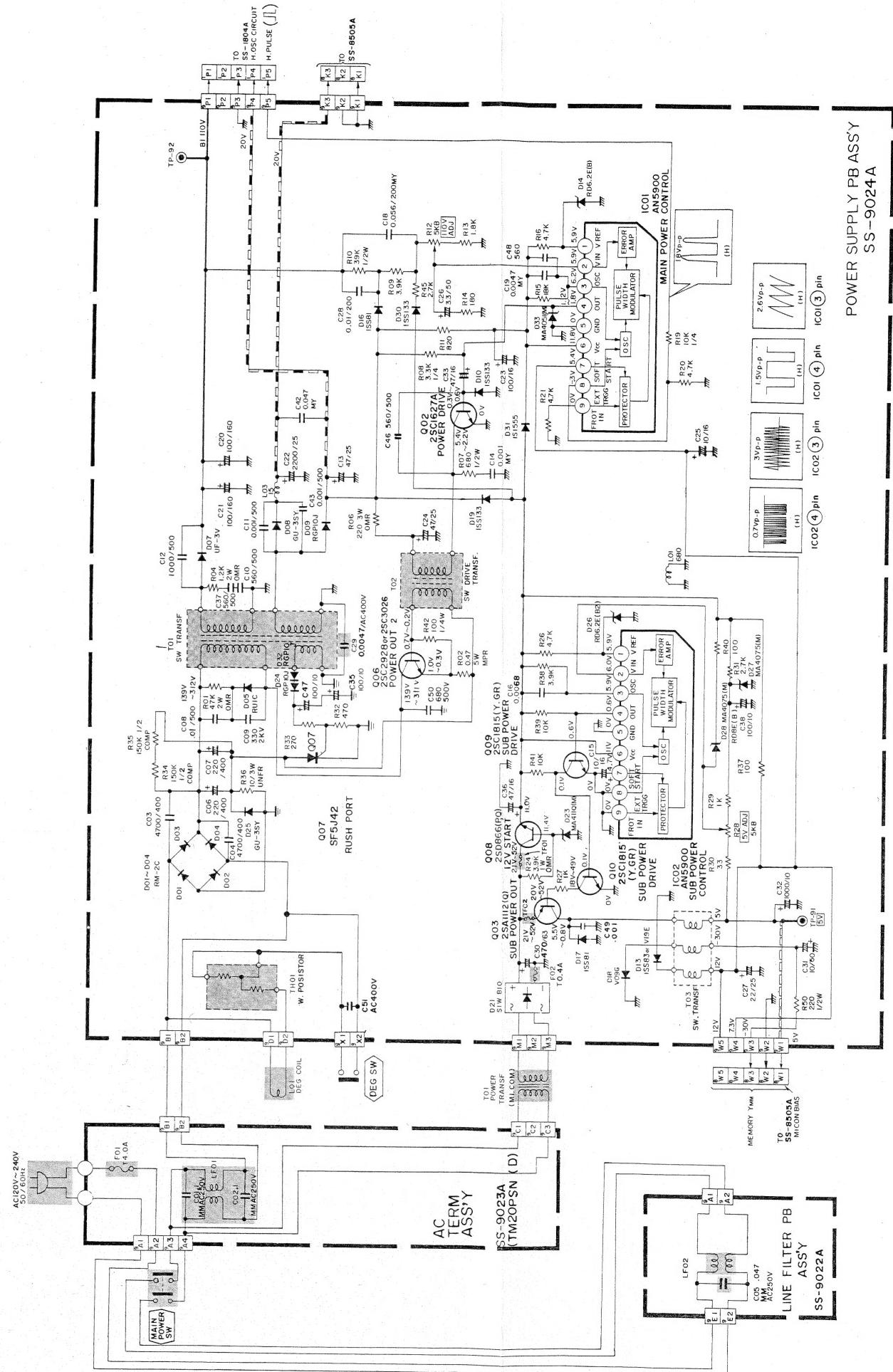
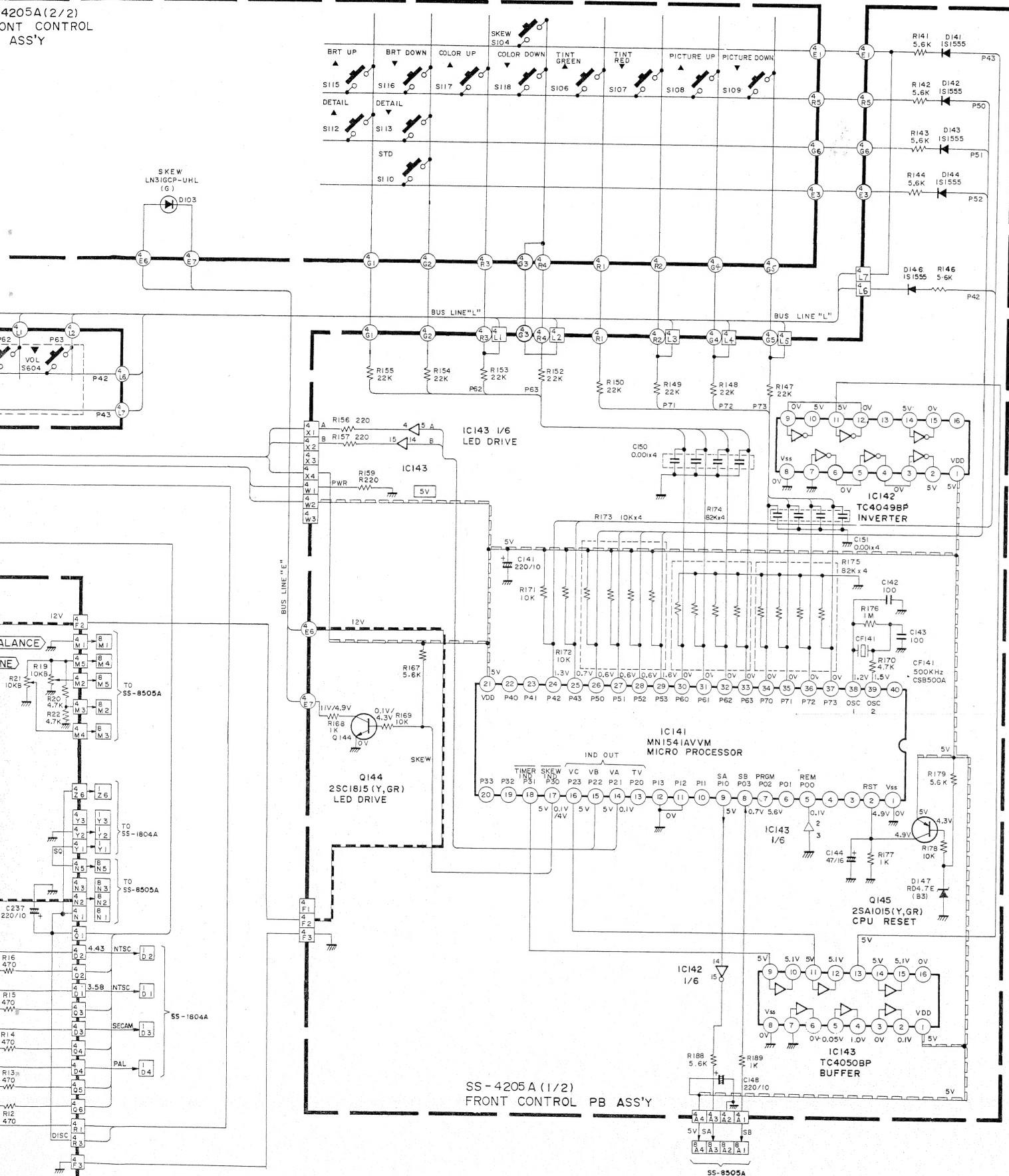


## SYSTEM SW/FRONT CONTROL SCHEMATIC DIAGRAM

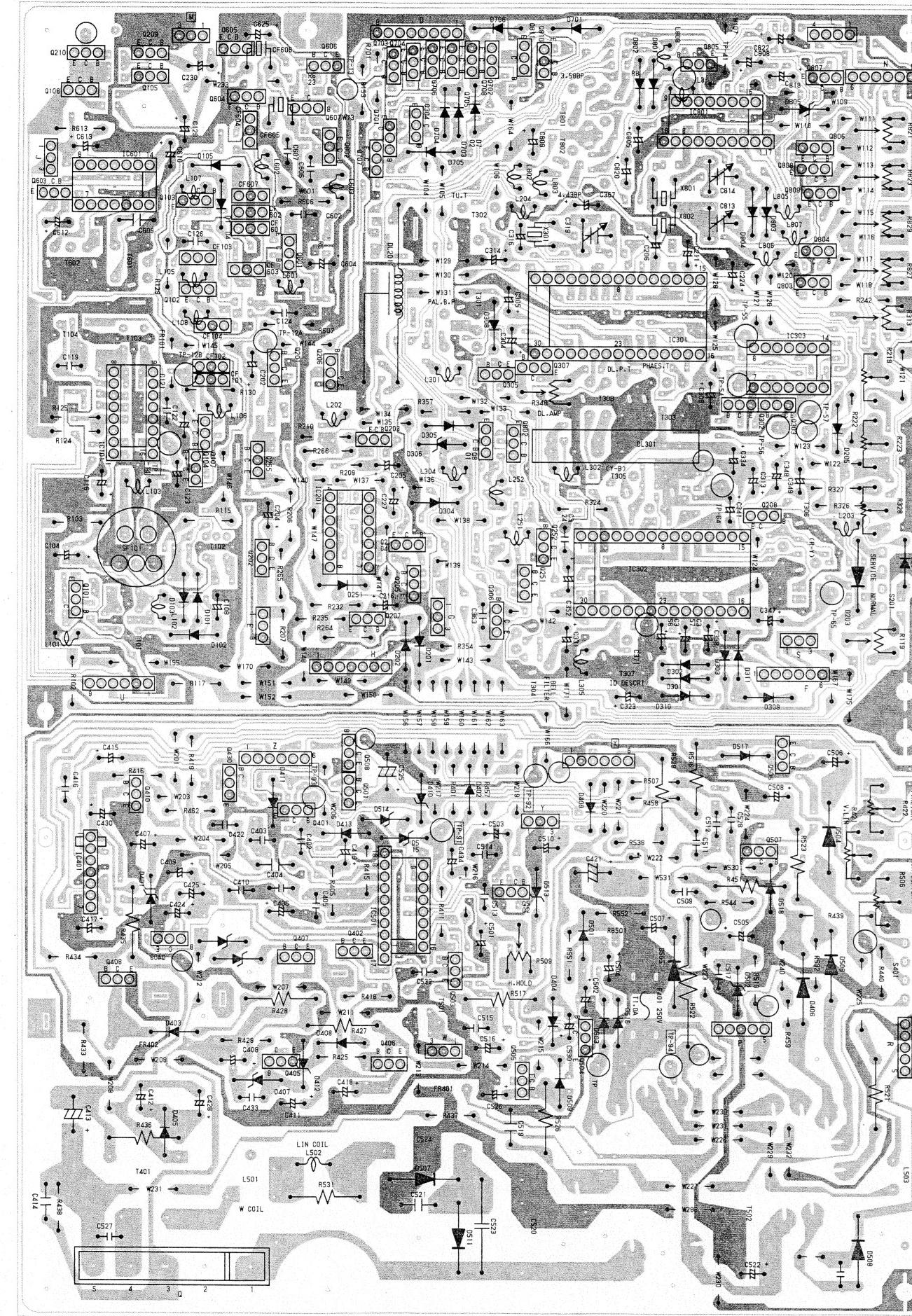


CONNECTOR	AUTO	PAL	SECAM	N3.58	N4.43
D07 (SW 1)	H(5 V)	L(0.5V)	H(3.8V)	L(0.4V)	L(0.4V)
D12 (SW 2)	—	H(3.7V)	H(3.2V)	L(0.2V)	L(0.2V)
D14 (SW 3)	—	—	—	H(8.9V)	L(0.2V)
D15 (SW 4)	L(-0.2V)	L(-0.2V)	H(3.8V)	H(0.3V)	H(0.4V)
Z4 (H,C)	—	H(4.2V)	H(3.7V)	L(0.1V)	L(0.V)
Z3 (V,F0)	—	H(12.4V)	H(2.5V)	L(0.1V)	L(0.1V)
Z2 (VFI)	—	L(0V)	L(0V)	H(3.3V)	H(3.3V)

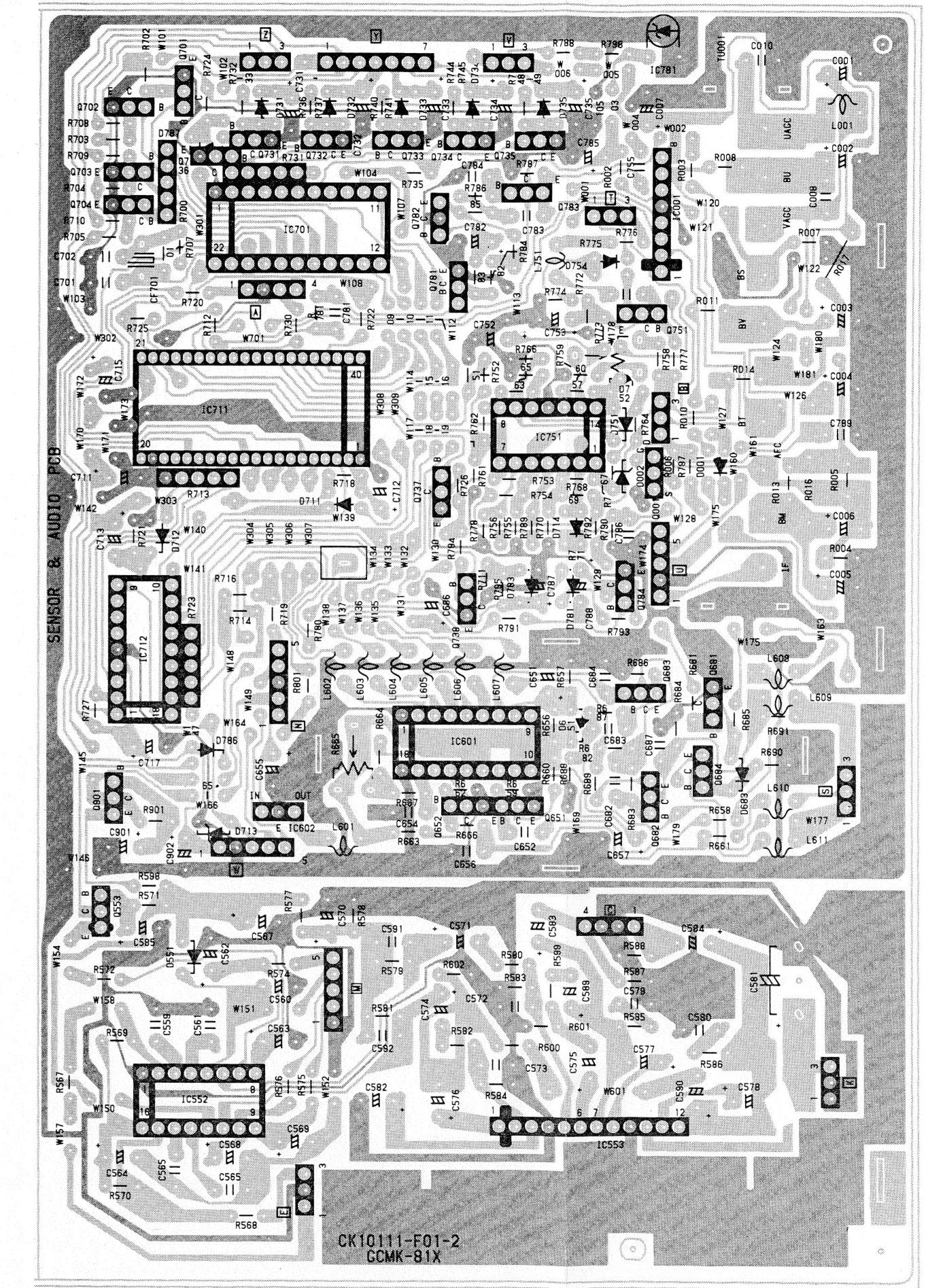
SS-4205A(2/2)  
FRONT CONTROL  
PB ASS'Y



## MAIN P.B. BACK PATTERN



## MICON SENSOR &amp; AUDIO OUT P.B. BACK PATTERN



CK20160-A02

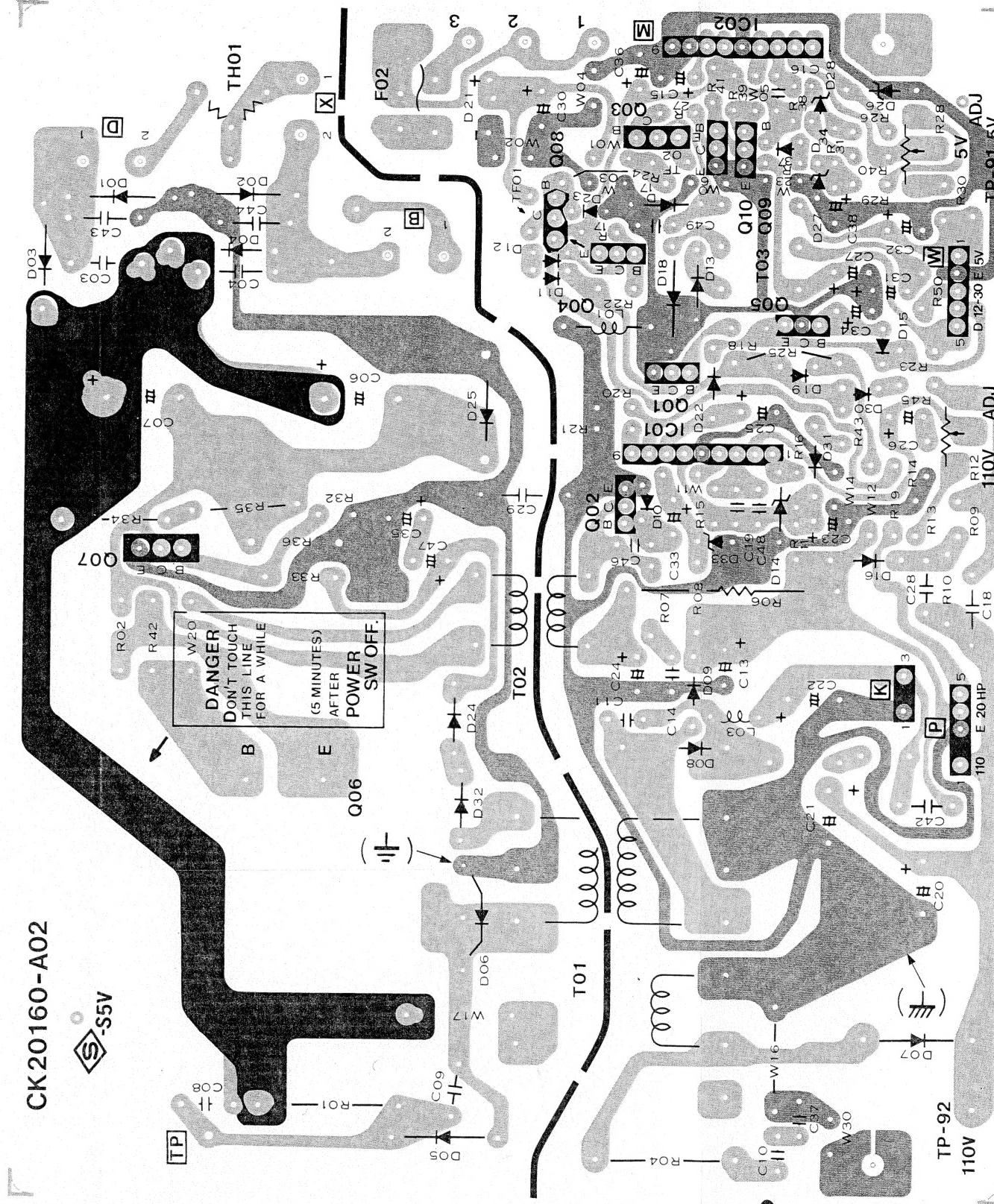
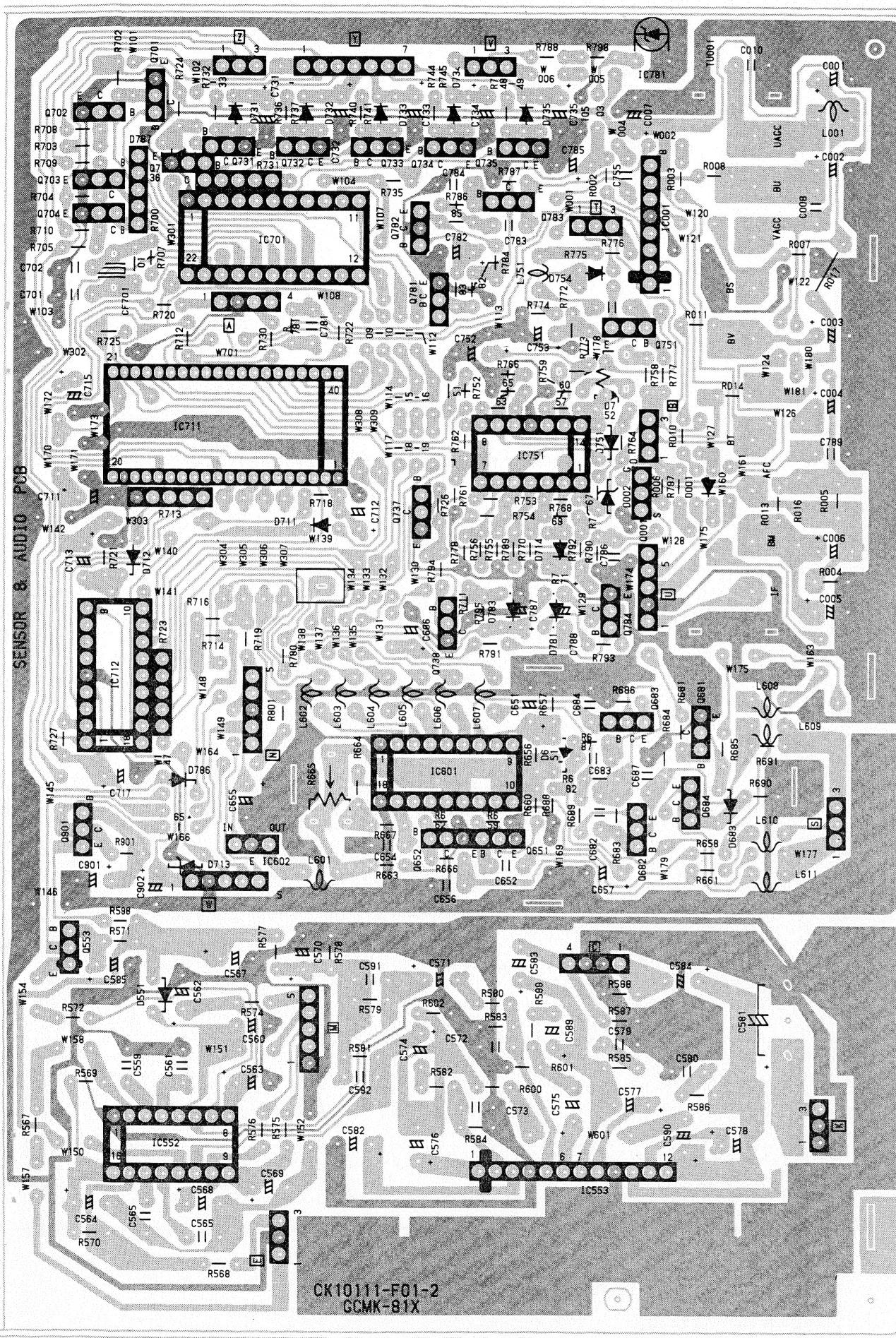
2SA1015(Y, C  
2SC1627A  
2SC1815(Y, C  
2SC2878(B)  
2SC3187

MICON SENSOR & AUDIO OUT P.B. BACK PATTERN

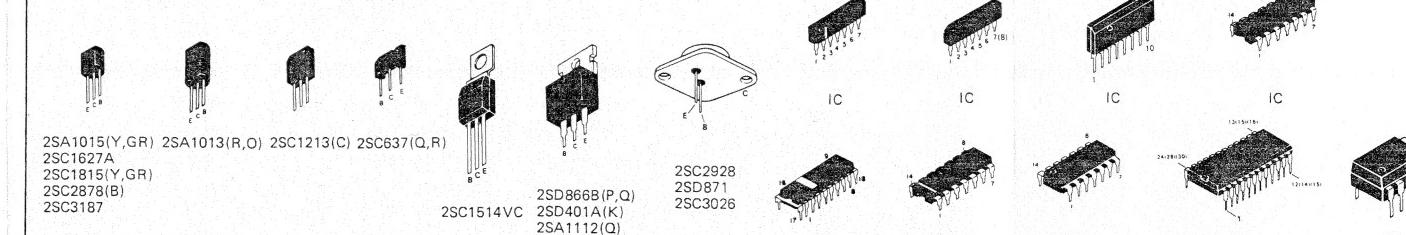
TM-20PSN (D)

TM-20PSN (D)

**POWER P.B. BACK PATT**



## ■ BASINGS OF TRANSISTOR &



2SA1015(Y,GR) 2SA1013(R,O) 2SC1213(C) 2S  
2SC1627A  
2SC1815(Y,GR)  
2SC2878(B)  
2SC3153

UDC  
BCE  
2SD8  
2SC1514VC 2SD4  
2SA1

2SC1815(Y,GR) 2SC2878(B) 2SC3187 2SC1514VC